

# Exhibit 35



CITY OF SAN DIEGO WATER REUSE STUDY  
Final Draft Report March 2006





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## Preface

*Water is essential to our growing economy and quality of life. The City of San Diego imports approximately 90 percent of its water supply from Northern California and the Colorado River. The City's other water sources are from stored local runoff and water recycling.*

*Over the past 20 years, the City's conservation programs have helped reduce per-capita water use, but population growth has continued to push up overall water use. Even with continued aggressive conservation efforts, the City projects it could need 25 percent more water in 2030 than today.*

*The City also faces challenges of ensuring its water supplies are reliable and environmentally sustainable. Existing imported supplies from the Colorado River and Northern California remain subject to reductions due to droughts. In addition, the need to import water, including water transfers, may also have incidental or unintended effects on other California ecosystems.*

*To address these challenges of growth, reliability and sustainability, the City's Long-Range Water Resource Plan identified the importance of recycled water in the City's overall water supply portfolio. The purpose of this Water Reuse Study is to conduct a comprehensive examination of the City's water recycling opportunities to support our future and our children's future.*

*Understanding the value and uses of recycled water is of critical importance in making informed choices and decisions. In developing recycled water uses, the City has several choices. Evaluating these choices requires considering more than just costs. Values, such as those listed below, will be at the heart of the public dialogue answering two critical questions: 1) what water recycling opportunities should be pursued?; and, 2) depending on the opportunity, how much water should be recycled?*

*Recycled water brings value to San Diego because it...*

- *enhances the reliability of our water supply;*
- *promotes a sustainable balance with our environment;*
- *is a locally controlled resource;*
- *reduces water diversions from other California ecosystems; and,*
- *is an investment in San Diego's future.*



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## 7.0 Assessment of Reuse Opportunities

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### Water Reuse Study

- 1.0 Introduction
- 2.0 Public Outreach and Education
- 3.0 Development and Supply Availability of Recycled Water
- 4.0 Overview of Water Reuse Opportunities and Public Health Protection
- 5.0 Non-Potable Reuse Opportunities
- 6.0 Indirect Potable Reuse Opportunities
- 7.0 Assessment of Reuse Opportunities**
  - 7.1 Recognizing the Value of Recycled Water**
  - 7.2 Overview of Alternative Implementation Strategies**
  - 7.3 North City Strategies**
  - 7.3 South Bay Strategies**
  - 7.4 Cost Evaluations**
  - 7.5 Evaluation Summary**
  - 7.7 Next Steps**

This analysis is consolidated into a combination of reuse opportunities, which are referred to as *strategies*. These strategies offer the San Diego public and Council a set of diverse reuse options for both the North City and South Bay systems. Decision charts, which could be referred to as roadmaps for each strategy's implementation, are included to summarize facilities and reuse volumes and were developed to help answer the primary study questions of: (1) which water recycling opportunities to pursue; and, (2) depending on the opportunity, how much water to recycle. Supporting text includes the benefits of each strategy, the value of recycled water, detailed costs for each strategy, and information on other water supply options.

In summary, this chapter:

- Revisits valuing recycled water as part of a diversified water supply portfolio and looks beyond unit costs when considering recycled water projects;
- Consolidates the opportunities listed in Sections 5 and 6 into six individual implementable strategies. Three strategies each are presented for North City and South Bay;
- Maps out the implementation of each strategy by steps;
- Presents detail of individual strategy costs along with the evaluation criteria established at the first Assembly workshop;
- Presents other water supply costs;
- Summarizes the conclusions for each strategy.

### 7.1 Recognizing the Value of Recycled Water

Understanding the uses and long-term value of recycled water is critical to making informed choices and decisions. The public, stakeholders, and policy makers have a challenging role in discussing and debating the strategies presented. Recycled water is a valuable asset – one that provides a locally controlled water supply, enhances supply reliability by diversifying supply sources, and enhances sustainability by limiting water diversions from other California ecosystems. Based on these benefits, the public and policy makers have been asked to determine the role of water reuse in San Diego's future.



## 7.2 Overview of Alternative Implementation Strategies

Six alternative implementation strategies were developed by combining individual opportunities from Sections 5 and 6 into a logical sequence of projects. Three opportunities are for the North City system and three are for the South Bay system. The strategies were developed to provide:

- A balanced and diverse set of both non-potable and indirect potable opportunities that represent the broad policy options available,
- A range of project steps that add new increments of recycled water usage within each strategy,
- A geographically balanced mix of projects.

Each strategy begins with the City's existing and planned projects, and then adds projects over a series of steps. The steps are not specifically defined in time, but for review purposes generally could be considered as approximately five-year increments from 2010 to 2025. The projects included in each step were organized based on a number of considerations, including:

- Maximizing the use of recycled water based on available supplies at each step,
- Selecting a lower cost project before a higher cost project, and
- Maximizing the ability to build upon existing or a previous step's infrastructure.

Most strategies can be pursued step-by-step all the way through to their final step or to some intermediate step. Some strategies maximize reuse in one large-scale project, while other strategies increase use gradually through smaller increments.

For each strategy, a summary table based on the evaluation criteria established at the first Assembly workshop was developed. The summary includes a description of the criteria with associated objectives and performance measures. A brief discussion is provided regarding those measures specific to the strategy.

## 7.3 North City Strategies

The City remains committed to completing the Phase I and II expansion of the North City recycled water distribution system. The City has also decided to pursue the infill opportunity described in Section 5. Infill provides the best approach to meet the City's Northern Service Area goal of beneficially using 12 MGD (13,400 AFY) by 2010. Other opportunities are more costly and/or cannot be completed by 2010. Therefore, infill is shown as the first component in each North City strategy.

### Description of North City Strategies

The components in each North City strategy, referred to as NC-1 through NC-3, are summarized in the following paragraphs. After each component summary is a strategy decision chart and two-page summary for each strategy. The two-page summary includes a figure displaying strategy components, text summarizing strategy details, primary strategy benefits, amendment



## Summary of North City Strategies

The resulting volume of reuse and associated costs vary per step and per strategy. The total reuse at the last step also varies between strategies depending on the approach and specific opportunities. **Table 7-1** summarizes the total reuse achieved for each opportunity in each strategy, both in AFY and as a percentage of the NCWRP's production capacity.

**Table 7-1**  
**Reuse Quantities for North City Strategies**

Reuse Project Components	Recycled Water Use By Strategy (AFY)		
	NC-1	NC-2	NC-3
<b>Reuse<sup>1</sup></b>			
Existing System (including Phases I and II)	9,440	9,440	9,440
Infill	3,820	3,820	3,820
Rancho Bernardo Phase III	2,110	2,110	-
San Vicente IPR (16 MGD Plant)	-	-	10,500
Central Service Area (CSA)	1,120	-	-
Lake Hodges IPR (2 MGD Plant)	-	1,800	-
Seasonal Storage	2,390	870	-
Wetlands	800	-	-
<i>Subtotal Demands</i>	<i>19,680</i>	<i>18,040</i>	<i>23,760</i>
<b>Supply</b>			
NCWRP Supply	26,880	26,880	26,880
Demineralization supply credit <sup>2</sup>	-	-	670
Advanced treatment process loss <sup>2</sup>	-	-635	-3,790
<i>Subtotal Supply</i>	<i>26,880</i>	<i>26,245</i>	<i>23,760</i>
<b>Treatment Capacity Utilized, %</b>	<b>73</b>	<b>69</b>	<b>100</b>

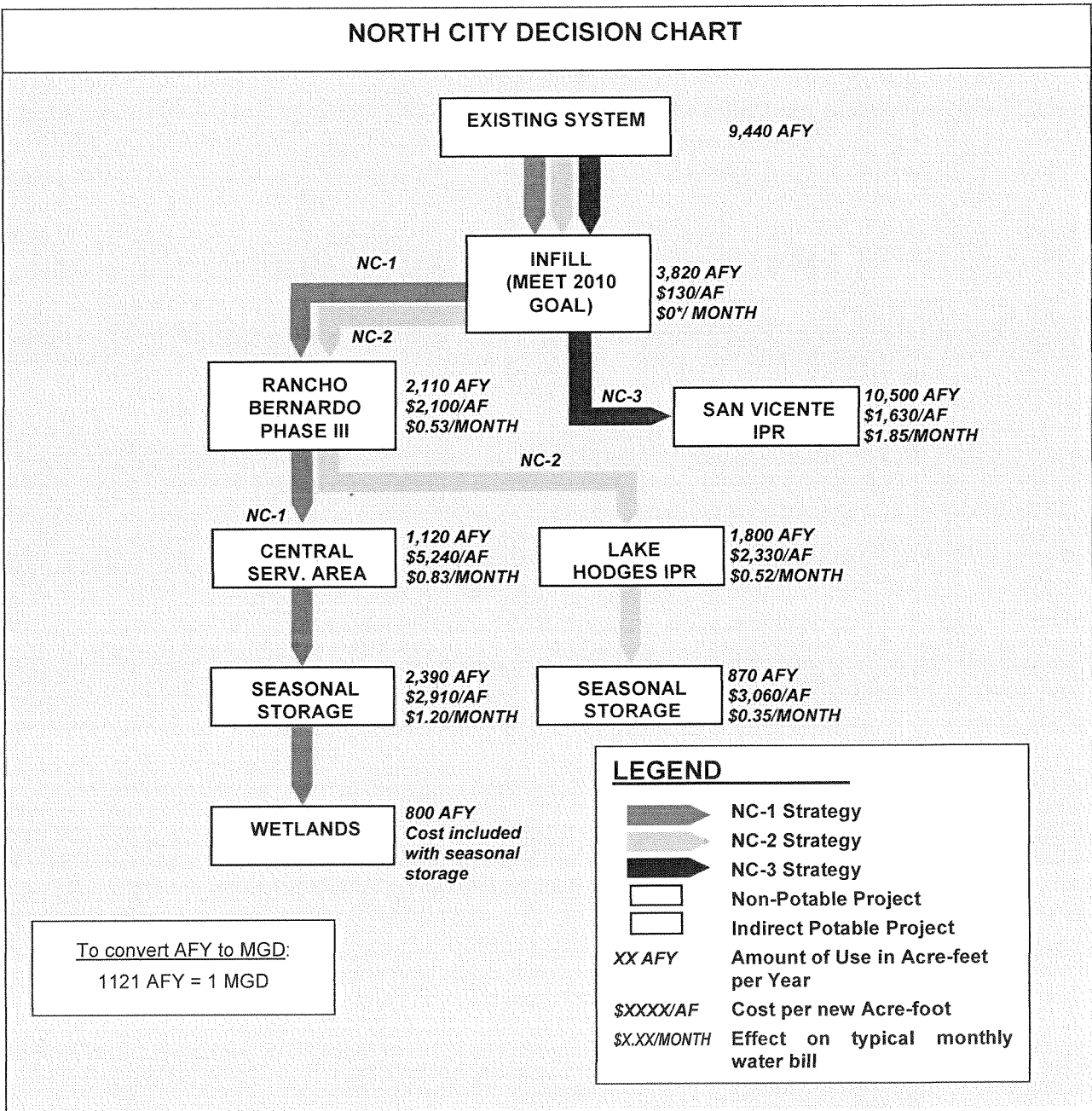
<sup>1</sup> Project reuse volumes assume the availability of seasonal storage as needed to supply peak summertime uses.

<sup>2</sup> Supply credits and losses were used to account for water lost as part of treatment processes. For IPR opportunities, demineralization is not needed at NCWRP (resulting in a supply credit), but losses will occur at the advanced water treatment plant (resulting in a loss of supply).

## North City Decision Chart

A decision chart of North City strategies is presented in **Figure 7-1**. Unit costs, the estimated effect on a typical monthly residential water bill, reuse volumes, and the proposed implementation plan are also shown. The decision chart is intended to help answer the following primary study questions: (1) which water recycling opportunities to pursue; and, (2) depending on the opportunity, how much water to recycle.





**Figure 7-1** – The decision chart summarizes potential water reuse strategies for the North City Water Reclamation Plant. All strategies for North City start with meeting the City's 2010 goal via infill. The NC-1 strategy includes non-potable opportunities. The NC-2 strategy includes a mix of both non-potable and indirect potable reuse opportunities. The NC-3 strategy is predominantly an indirect potable reuse opportunity. Costs are shown for each strategy.

\* Increased recycled water sales are projected to offset project costs.



# North City Strategy NC-1 Two-Page Summary

## Project Description

Expansion of the non-potable system to serve infill, Phase III Rancho Bernardo, the Central Service Area, and Rose Canyon wetlands.

## Primary Benefit of this Strategy

NC-1 provides the lowest initial capital cost and lowest unit cost through the second step of the strategy. However, if the desire is to maximize use of the available recycled water supply, subsequent steps have higher unit costs and make this alternative comparatively more expensive. This strategy appears to be the appropriate choice if the driving decision factors are to minimize initial capital outlays and to commit to a non-potable reuse approach.

## Implementation:

- Infill to serve new customers within one-quarter mile of the existing distribution system (up to 3,820 AFY).
- Phase III expansion of the existing system into Rancho Bernardo to primarily serve golf courses (up to 2,110 AFY).
- Expansion into the Central Service Area to serve Mission Bay and Balboa Parks (up to 1,120 AFY).
- Through the initial implementation steps, purchase raw or treated potable water to meet summer demand peaks. Subsequent development of recycled water seasonal storage would store surplus recycled water during the winter for use in the summer.
- Use of excess recycled water in winter months for a created wetland in Rose Canyon (800 AFY).

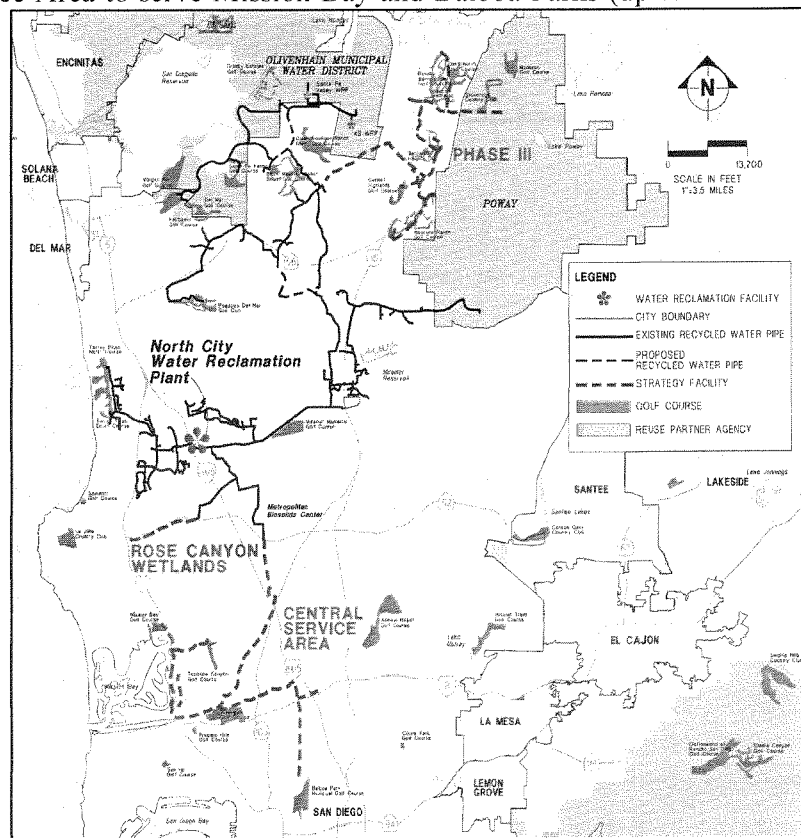


Figure 7-2 - North City Strategy NC-1



NC-1 – Evaluation Criteria Detail		
Criteria	Objective and Performance Measure	Discussion
Health and Safety	To protect human health and safety with regard to recycled water use. Meets or exceeds federal, state and local regulatory criteria for recycled water uses.	City's non-potable service of recycled water meets federal, state and local regulatory criteria and has been safely operated since 1997.
Social Value	To maximize beneficial use of recycled water with regard to quality of life and equal service to all socioeconomic groups. Comparison of beneficial uses and their effect on human needs and aesthetics, as well as public perception.	<b>Human Need:</b> Non-potable recycled water distribution system serves a human need by replacing potable water use. However, the system's distribution system is limited and not everyone directly benefits from recycled water use. <b>Public Perception:</b> The public in general perceives that non-potable use of recycled water is preferable to indirect potable reuse.
Environmental Value	To enhance, develop or improve local habitat or ecosystems and avoid or minimize negative environmental impacts. Comparison of environmental impacts and/or enhancements, environmental impacts avoided, and permits are required.	Offsets discharge of wastewater to the ocean. Negative environmental impacts due to construction are temporary.
Local Water Reliability	To substantially increase the percentage of water supply that comes from water reuse, thereby offsetting the need for imported water. Increases percent of water recycling and improves local reliability.	Up to <b>19,680 AFY</b> of recycled water is reused in this strategy. This amounts to approximately <b>73%</b> of the available recycled water from the NCWRP.
Water Quality	Meets or exceeds level of quality required for the intended use and customer needs; to meet all customer quality requirements.	Use of non-potable, recycled water for irrigation provides the benefit of nutrient value to irrigated areas. City ensures TDS to be equal or less than 1000 mg/l.
Technical Feasibility	To assess the physical implementation of the strategy.	The facilities must be built in a cost-effective and timely manner.
Operational Reliability	To maximize ability of facilities to perform under a range of future conditions. Level of demand met and opportunities for system interconnections and operational flexibility are addressed.	Recycled water treatment and distribution systems are not operated with redundancy of facilities in mind. Outages of recycled water service are more likely to occur than in a potable water system.
Cost	To minimize total cost to the community. Comparison of estimated capital improvement costs, operational costs, and revenues for each reuse opportunity, as well as comparison of estimated avoided costs such as future regional water and wastewater infrastructure costs and costs to develop alternative water supplies (e.g. desalination).	See Section 7.5 for Cost Discussion.
Ability to Implement	To evaluate viability or fatal flaws and assess political and public acceptability. Level of difficulty in physical, social or regulatory implementation.	Non-potable recycled water projects are generally easier to implement than indirect potable projects as they require less regulatory permitting. These types of projects have a regulatory framework to follow and general public support.

**Figure 7-3 NC 1 – Evaluation Criteria Detail**



## North City Strategy NC-2 Two-Page Summary

### Project Description

Expansion of the non-potable system to serve infill and Phase III Rancho Bernardo, followed by a small-scale IPR project at Lake Hodges.

### Primary Benefit of this Strategy

Strategy NC-2 provides the opportunity to switch from non-potable to IPR. This strategy appears to be the appropriate choice if the driving decision factor is to minimize initial expenditures, while still having the ability to accomplish an IPR project.

### Implementation:

- Infill to serve new customers within one quarter-mile of the existing distribution system (up to 3,820 AFY).
- Phase III expansion of the existing system into Rancho Bernardo to primarily serve golf courses (up to 2,110 AFY).
- Small-scale IPR project at Lake Hodges (1,800 AFY).
- Through early implementation steps, summer peak can be met with purchased potable or raw water. Subsequent development of recycled water seasonal storage would store surplus recycled water during the winter for use in the summer.

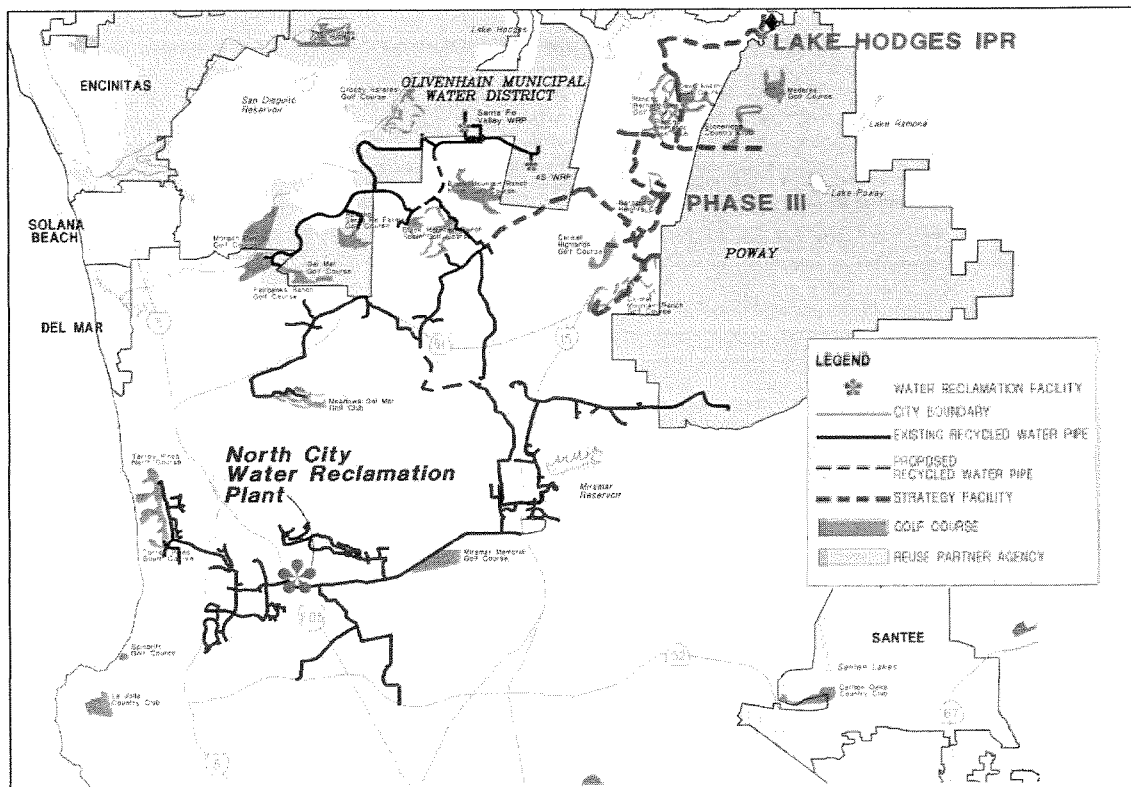


Figure 7-4 North City Strategy NC-2



NC-2 – Evaluation Criteria Detail		
Criteria	Objective and Performance Measure	Discussion
Health and Safety	To protect human health and safety with regard to recycled water use. Meets or exceeds federal, state and local regulatory criteria for recycled water uses.	City's non-potable service of recycled water meets federal, state and local regulatory criteria and has been safely operated since 1997. New IPR projects would be designed to meet federal, state and local regulatory requirements.
Social Value	To maximize beneficial use of recycled water with regard to quality of life and equal service to all socioeconomic groups. Comparison of beneficial uses and their effect on human needs and aesthetics, as well as public perception.	<b>Human Need:</b> Both non-potable and IPR provide water to the community, but IPR projects distribute the purified water to a greater number of people. <b>Public Perception:</b> Non-potable uses are highly supported based on the findings of the Study's public outreach efforts, but IPR projects are not as high.
Environmental Value	To enhance, develop or improve local habitat or ecosystems and avoid or minimize negative environmental impacts. Comparison of environmental impacts and/or enhancements, environmental impacts avoided, and permits are required.	Offsets discharge of wastewater to the ocean. Negative environmental impacts due to construction are temporary.
Local Water Reliability	To substantially increase the percentage of water supply that comes from water reuse, thereby offsetting the need for imported water. Increases percent of water recycling and improves local reliability.	Up to <b>18,040 AFY</b> of recycled water is used in this strategy. Including advanced treatment process uses for the IPR components, the complete strategy utilizes approximately <b>69%</b> of the available recycled water from the NCWRP.
Water Quality	Meets or exceeds level of quality required for the intended use and customer needs; to meet all customer quality requirements.	Treatment methodology and monitoring will ensure appropriate water quality for intended uses: non-potable or indirect potable.
Technical Feasibility	To assess the physical implementation of the strategy.	The necessary facilities must be built in a timely and cost-effective manner.
Operational Reliability	To maximize ability of facilities to perform under a range of future conditions. Level of demand met and opportunities for system interconnections and operational flexibility are addressed.	IPR project provides operational reliability as it takes full advantage of the redundancy of the City's potable water distribution system and increases the use of water produced at the City's water reclamation plants.
Cost	To minimize total cost to the community. Comparison of estimated capital improvement costs, operational costs, and revenues for each reuse opportunity, as well as comparison of estimated avoided costs such as future regional water and wastewater infrastructure costs and costs to develop alternative water supplies (e.g. desalination).	See Section 7.5 for Cost Discussion.
Ability to Implement	To evaluate viability or fatal flaws and assess political and public acceptability. Level of difficulty in physical, social or regulatory implementation.	IPR project is anticipated to be more difficult to implement due to regulatory and social issues. Extensive public outreach effort will be required to implement the IPR component of this strategy. The Lake Hodges IPR project has additional hurdles since the first inline water treatment plants are not City facilities.

**Figure 7-5 NC 2 – Evaluation Criteria Detail**



## North City Strategy NC-3 Two-Page Summary

### Project Description

Expansion of the non-potable system to serve infill, followed by a large-scale San Vicente Reservoir IPR project sized to maximize available supplies.

### Primary Benefit of this Strategy

NC-3 maximizes the available North City water supply in one step through IPR. For a strategy that fully maximizes use of the available recycled water supply, it provides the lowest overall unit cost. Accomplishing this, however, involves the highest initial capital costs. This strategy appears to be the appropriate choice if the driving decision factors are to maximize recycled water use and have the lowest ultimate unit cost.

### Implementation:

- Infill to serve new customers within one-quarter mile of the existing distribution system (up to 3,820 AFY).
- Large-scale 16 MGD capacity San Vicente Reservoir Augmentation (IPR) project to utilize the wintertime supply from the NCWRP, after other non-potable uses (10,500 AFY).
- Small amount of potable water may be needed to meet summer demand with purchased potable water.

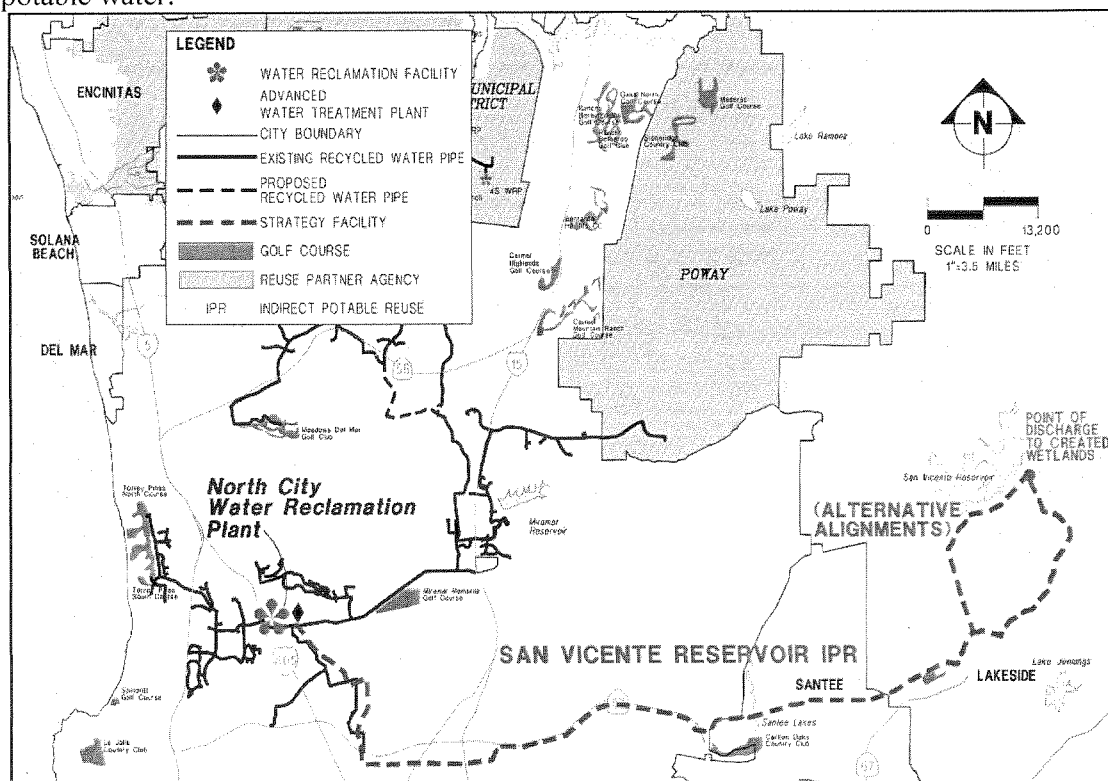


Figure 7-6 North City Strategy NC-3



NC-3 – Evaluation Criteria Detail		
Criteria	Objective and Performance Measure	Discussion
Health and Safety	To protect human health and safety with regard to recycled water use. Meets or exceeds federal, state and local regulatory criteria for recycled water uses.	City's non-potable service of recycled water meets federal, state and local regulatory criteria and has been safely operated since 1997. New indirect potable project would be designed to meet federal, state and local regulatory requirements.
Social Value	To maximize beneficial use of recycled water with regard to quality of life and equal service to all socioeconomic groups. Comparison of beneficial uses and their effect on human needs and aesthetics, as well as public perception.	<b>Human Need:</b> Both non-potable and IPR provide water to the community, but IPR projects distribute the purified water to a greater number of people. <b>Public Perception:</b> Non-potable uses are highly supported based on the findings of the Study's public outreach efforts, but IPR projects are not as high.
Environmental Value	To enhance, develop or improve local habitat or ecosystems and avoid or minimize negative environmental impacts. Comparison of environmental impacts and/or enhancements, environmental impacts avoided, and permits are required.	Offsets discharge of wastewater to the ocean. Negative environmental impacts due to construction are temporary. Wetlands associated with IPR projects are generally acceptable to environmentalists.
Local Water Reliability	To substantially increase the percentage of water supply that comes from water reuse, thereby offsetting the need for imported water. Increases percent of water recycling and improves local reliability.	Up to <b>23,760 AFY</b> of recycled water is used in this strategy. Including advanced treatment process uses for the IPR components, the complete strategy achieves <b>100 %</b> utilization of the available recycled water from the NCWRP.
Water Quality	Meets or exceeds level of quality required for the intended use and customer needs; to meet all customer quality requirements.	Treatment methodology and monitoring will ensure appropriate water quality for intended uses: non-potable or indirect potable.
Technical Feasibility	To assess the physical implementation of the strategy.	The necessary facilities must be built in a timely and cost-effective manner.
Operational Reliability	To maximize ability of facilities to perform under a range of future conditions. Level of demand met and opportunities for system interconnections and operational flexibility are addressed.	IPR project provides operational reliability as it takes full advantage of the redundancy of the City's potable water distribution system and increases the use of water produced at the City's water reclamation plants.
Cost	To minimize total cost to the community. Comparison of estimated capital improvement costs, operational costs, and revenues for each reuse opportunity, as well as comparison of estimated avoided costs such as future regional water and wastewater infrastructure costs and costs to develop alternative water supplies (e.g. desalination).	See Section 7.5 for Cost Discussion.
Ability to Implement	To evaluate viability or fatal flaws and assess political and public acceptability. Level of difficulty in physical, social or regulatory implementation.	IPR project is anticipated to be more difficult to implement due to the regulatory and social issues. Extensive public outreach effort will be required to implement the IPR component of this strategy.

Figure 7-7 NC 3 – Evaluation Criteria Detail



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## **7.4 South Bay Strategies**

All South Bay strategies include the existing uses at the South Bay and IBWC treatment plants. In addition, the City plans to fulfill their 6 MGD commitment to the OWD by 2007. Therefore, existing uses and service to OWD are shown as the first components in each South Bay strategy.

### **Description of South Bay Strategies**

The paragraphs below summarize the components in each South Bay strategy, referred to as SB-1 through SB-3. Following the component summary is a strategy decision chart and two-page summary for each strategy. The two-page summary includes a figure displaying strategy components, text summarizing the strategy details, primary strategy benefits, strategy usage, implementation issues, and analysis of evaluation criteria developed at the first Assembly workshop.

**SB-1:** The SB-1 Strategy includes only non-potable projects similar to the City's existing recycled water program. After serving OWD, SB-1 proposes to serve Sweetwater Authority with the remaining available recycled water supply.

**SB-2:** The SB-2 Strategy includes a small-scale IPR opportunity at Otay Lakes, following the baseline OWD project.

**SB-3:** The SB-3 Strategy includes a large-scale IPR opportunity at Otay Lakes, following the baseline OWD project, which maximizes use from the SBWRP in one step.



## Summary of South Bay Strategies

The resulting volume of use and costs vary per step and per strategy. The total use at the last step also varies between strategies depending on the approach and specific opportunities. **Table 7-2** summarizes the total use achieved for each opportunity in each strategy, and the percent of SBWRP capacity utilized.

**Table 7-2**  
**Reuse Quantities for South Bay Strategies**

Reuse Project Components	Recycled Water Use By Strategy (AFY)		
	SB-1	SB-2	SB-3
<b>Reuse<sup>1</sup></b>			
SBWRP onsite usage	560	560	560
IBWC onsite usage	840	840	840
Otay Water District	5,760	5,760	5,760
Sweetwater Authority	5,880	-	-
Otay IPR Small-Scale (2 MGD Plant)	-	1,800	-
Otay IPR Large-Scale (7.5 MGD Plant)	-	-	5,500
<i>Subtotal Demands</i>	<i>13,040</i>	<i>8,960</i>	<i>12,660</i>
<b>Supply</b>			
SBWRP Supply	15,120	15,120	15,120
Demineralization supply credit <sup>2</sup>	-	-	-
Advanced treatment process loss <sup>2</sup>	-	-640	-1940
<i>Subtotal Supply</i>	<i>15,120</i>	<i>14,480</i>	<i>13,180</i>
<b>Treatment Capacity Utilized, %</b>	<b>86</b>	<b>62</b>	<b>96</b>

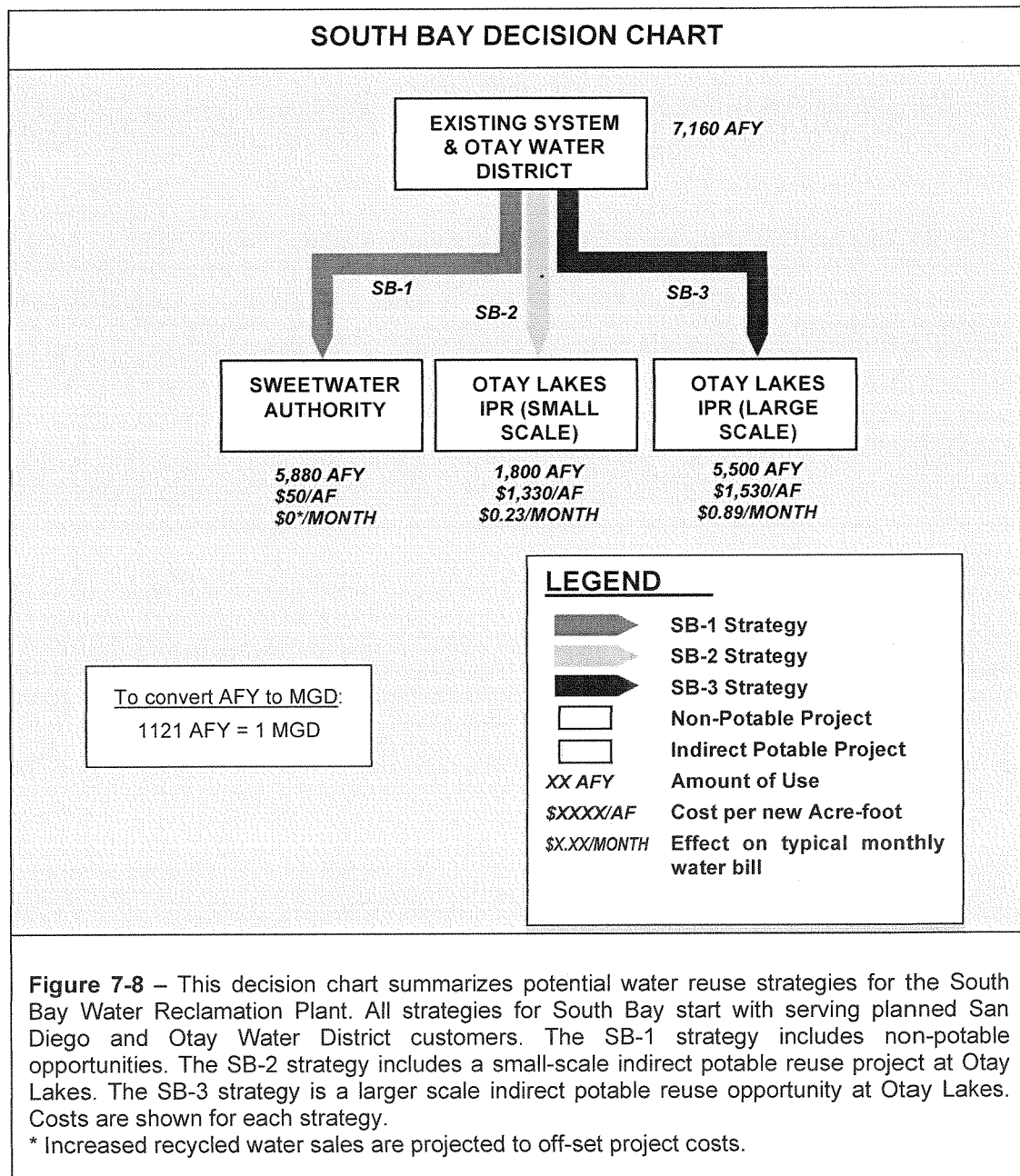
<sup>1</sup> Project reuse volumes assume the availability of seasonal storage as needed to supply peak summertime uses.

<sup>2</sup> Supply credits and losses were used to account for water lost as part of treatment processes. For IPR opportunities, demineralization is not needed at SBWRP (resulting in a supply credit), but losses will occur at the advanced water treatment plant (resulting in a loss of supply).



## South Bay Decision Chart

A decision chart of South Bay strategies is presented in Figure 7-8. Unit costs, the effect on a typical monthly residential water bill, reuse volumes, and the proposed implementation plan are also shown. The decision chart is intended to help answer the following primary study questions: (1) which water recycling opportunities to pursue and (2) depending on the opportunity, how much water to recycle.



## South Bay Strategy SB-1 Two-Page Summary

### Project Description

Expansion of the non-potable system to serve OWD and Sweetwater Authority.

### Primary Benefit of this Strategy

Strategy SB-1 results in the lowest initial capital cost and lowest unit cost of all South Bay strategies. This strategy appears to be the appropriate choice if the driving decision factor is to minimize expenditures, even if the use occurs outside City service areas.

### Implementation:

- Existing System and OWD (up to 7,160 AFY).
- Expansion of the existing system to serve Sweetwater Authority and its customers (up to 5,880 AFY).

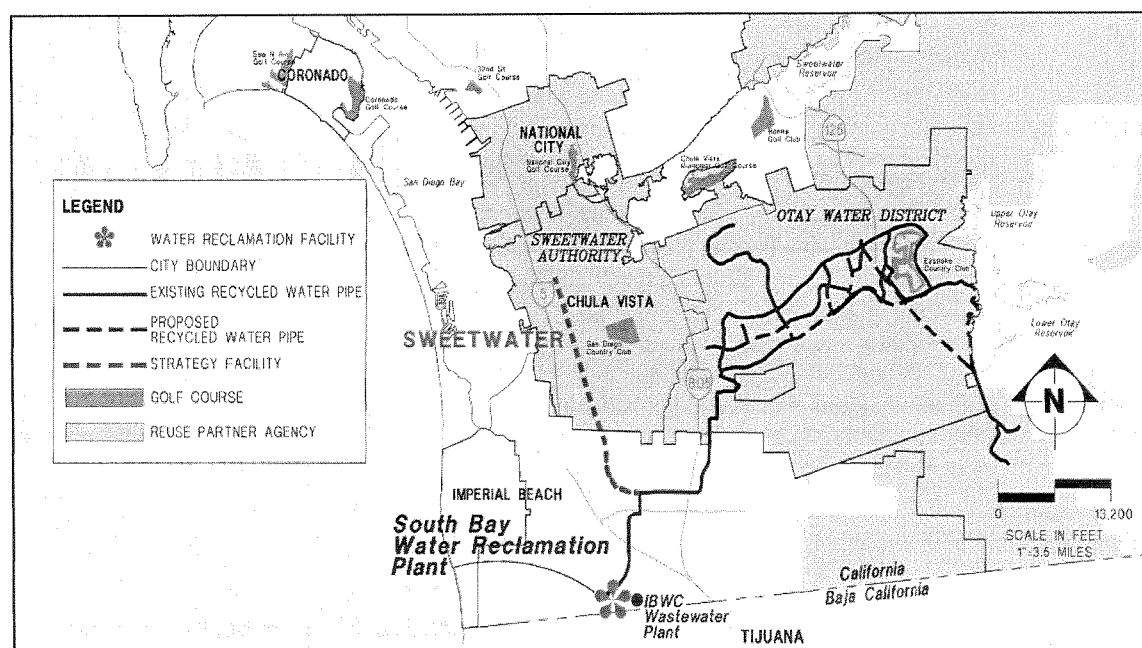


Figure 7-9 South Bay Strategy SB-1



SB-1 – Evaluation Criteria Detail		
Criteria	Objective and Performance Measure	Discussion
Health and Safety	To protect human health and safety with regard to recycled water use. Meets or exceeds federal, state and local regulatory criteria for recycled water uses.	City's non-potable service of recycled water meets federal, state and local regulatory criteria and has been safely operated since 1997.
Social Value	To maximize beneficial use of recycled water with regard to quality of life and equal service to all socioeconomic groups. Comparison of beneficial uses and their effect on human needs and aesthetics, as well as public perception.	<b>Human Need:</b> Non-potable use serves a human need by replacing potable water use. However, the system's distribution system is limited and not everyone directly benefits from recycled water use. <b>Public Perception:</b> The public in general perceives that non-potable use of recycled water is preferable to IPR.
Environmental Value	To enhance, develop or improve local habitat or ecosystems and avoid or minimize negative environmental impacts. Comparison of environmental impacts and/or enhancements, environmental impacts avoided, and permits are required.	Offsets discharge of wastewater to the ocean. Negative environmental impacts due to construction are temporary.
Local Water Reliability	To substantially increase the percentage of water supply that comes from water reuse, thereby offsetting the need for imported water. Increases percent of water recycling and improves local reliability.	Up to <b>13,040 AFY</b> of recycled water is used in this strategy. This amounts to approximately <b>86%</b> of the available recycled water from the SBWRP.
Water Quality	Meets or exceeds level of quality required for the intended use and customer needs; to meet all customer quality requirements.	Use of non-potable, recycled water for irrigation provides the benefit of nutrient value to irrigated areas. City ensures TDS to be equal or less than 1000 mg/L.
Technical Feasibility	To assess the physical implementation of the strategy.	The necessary facilities must be built in a timely and cost-effective manner.
Operational Reliability	To maximize ability of facilities to perform under a range of future conditions. Level of demand met and opportunities for system interconnections and operational flexibility are addressed.	Recycled water treatment and distribution systems are not operated with redundancy of facilities in mind. Outages of recycled water service are more likely to occur than in a potable water system. This scenario takes advantage of a new regional interconnection with Sweetwater Authority.
Cost	To minimize total cost to the community. Comparison of estimated capital improvement costs, operational costs, and revenues for each reuse opportunity, as well as comparison of estimated avoided costs such as future regional water and wastewater infrastructure costs and costs to develop alternative water supplies (e.g. desalination).	See Section 7.5 for Cost Discussion.
Ability to Implement	To evaluate viability or fatal flaws and assess political and public acceptability. Level of difficulty in physical, social or regulatory implementation.	The implementation of this strategy relies upon a new large customer moving into the Sweetwater Authority Service Area.

**Figure 7-10 SB-1 – Evaluation Criteria Detail**



## South Bay Strategy SB-2 Two-Page Summary

### Project Description

Expansion of the non-potable system to serve OWD, followed by a small-scale IPR opportunity at Lower Otay Reservoir.

### Primary Benefit of this Strategy

Strategy SB-2 includes a mix of non-potable uses and a small-scale IPR project. This strategy appears to be an appropriate choice if either of the driving decision factors are to retain use of the South Bay recycled water within the City, or if the projected non-potable uses envisioned in strategy SB-1 do not come to fruition.

### Implementation:

- Existing System and OWD (up to 7,160 AFY).
- A small-scale IPR project at Lower Otay Reservoir with created wetlands located upstream of the Upper Otay Reservoir (1,800 AFY).

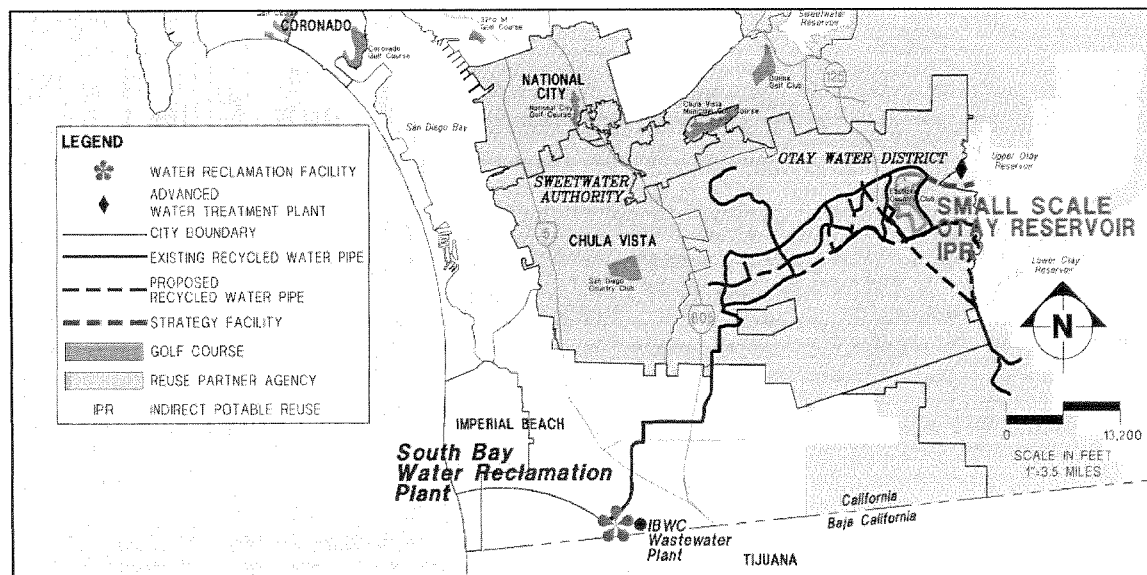


Figure 7-11 South Bay Strategy SB-2



SB-2 – Evaluation Criteria Detail		
Criteria	Objective and Performance Measure	Discussion
Health and Safety	To protect human health and safety with regard to recycled water use. Meets or exceeds federal, state and local regulatory criteria for recycled water uses.	City's non-potable service of recycled water meets federal, state and local regulatory criteria and has been safely operated since 1997. New indirect potable project would be designed to meet federal, state and local regulatory requirements.
Social Value	To maximize beneficial use of recycled water with regard to quality of life and equal service to all socioeconomic groups. Comparison of beneficial uses and their effect on human needs and aesthetics, as well as public perception.	<b>Human Need:</b> Both non-potable and IPR provide water to the community, but an IPR project distributes purified water to a greater number of people. <b>Public Perception:</b> Non-potable uses are highly supported based on the findings of the Study's public outreach efforts, but IPR projects are not as high.
Environmental Value	To enhance, develop or improve local habitat or ecosystems and avoid or minimize negative environmental impacts. Comparison of environmental impacts and/or enhancements, environmental impacts avoided, and permits are required.	Offsets discharge of wastewater to the ocean. Negative environmental impacts due to construction are temporary. Wetlands associated with an IPR project are generally acceptable to environmentalists.
Local Water Reliability	To substantially increase the percentage of water supply that comes from water reuse, thereby offsetting the need for imported water. Increases percent of water recycling and improves local reliability.	Up to <b>8,960 AFY</b> of recycled water is used in this strategy. Including advanced treatment process uses for the IPR components, the complete strategy utilizes approximately <b>62%</b> of the available recycled water from the SBWRP.
Water Quality	Meets or exceeds level of quality required for the intended use and customer needs; to meet all customer quality requirements.	Treatment methodology and monitoring will ensure appropriate water quality for intended uses: non-potable or indirect potable.
Technical Feasibility	To assess the physical implementation of the strategy.	The necessary facilities must be built in a timely and cost-effective manner.
Operational Reliability	To maximize ability of facilities to perform under a range of future conditions. Level of demand met and opportunities for system interconnections and operational flexibility are addressed.	An IPR project provides operational reliability as it takes full advantage of the redundancy of the City's potable water distribution system and increases the use of water produced at the City's water reclamation plant.
Cost	To minimize total cost to the community. Comparison of estimated capital improvement costs, operational costs, and revenues for each reuse opportunity, as well as comparison of estimated avoided costs such as future regional water and wastewater infrastructure costs and costs to develop alternative water supplies (e.g. desalination).	See Section 7.5 for Cost Discussion.
Ability to Implement	To evaluate viability or fatal flaws and assess political and public acceptability. Level of difficulty in physical, social or regulatory implementation.	An IPR project is anticipated to be more difficult to implement due to regulatory and social issues. Extensive public outreach efforts will be required to implement the IPR component of this strategy.

**Figure 7-12 SB-2 – Evaluation Criteria Detail**



## South Bay Strategy SB-3 Two-Page Summary

### Project Description

Expansion of the non-potable system to serve OWD, followed by a large-scale IPR opportunity at Lower Otay Reservoir.

### Primary Benefit of this Strategy

Strategy SB-3 includes a mix of non-potable uses and a large-scale IPR project. This strategy appears to be an appropriate choice if the driving decision factors are to retain use of the South Bay recycled water within the City, or if the projected non-potable uses envisioned in strategy SB-1 do not come to fruition.

### Implementation:

- Existing System and OWD (up to 7,160 AFY).
- A large-scale IPR project at Lower Otay Reservoir with created wetlands located upstream of the Upper Otay Reservoir (5,500 AFY).

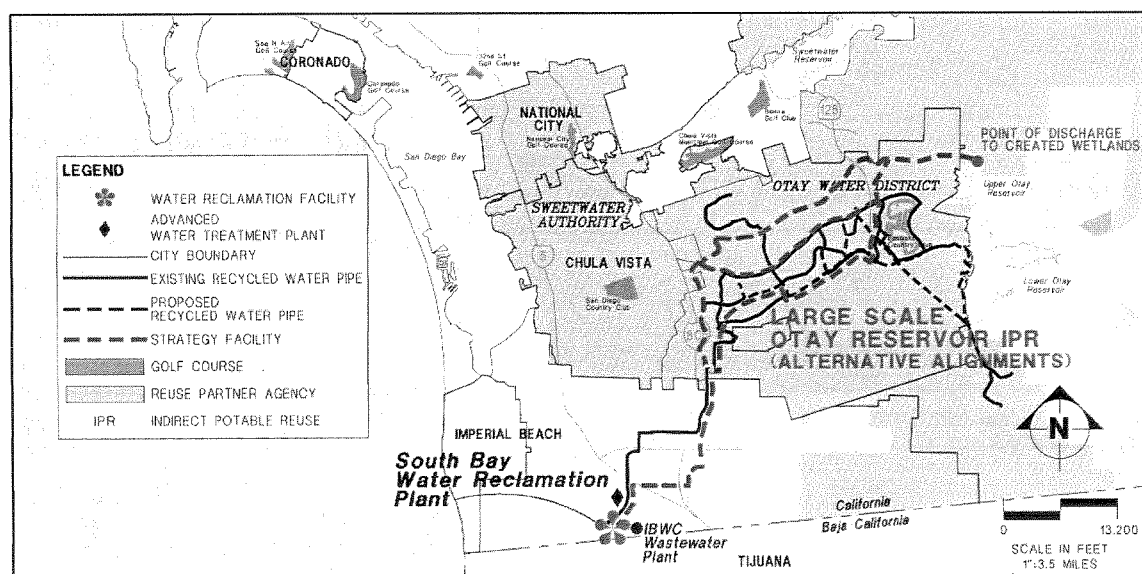


Figure 7-13 South Bay Strategy SB-3



SB-3 – Evaluation Criteria Detail		
Criteria	Objective and Performance Measure	Discussion
Health and Safety	To protect human health and safety with regard to recycled water use. Meets or exceeds federal, state and local regulatory criteria for recycled water uses.	City's non-potable service of recycled water meets federal, state and local regulatory criteria and has been safely operated since 1997. New indirect potable projects would be designed to meet federal, state and local regulatory requirements.
Social Value	To maximize beneficial use of recycled water with regard to quality of life and equal service to all socioeconomic groups. Comparison of beneficial uses and their effect on human needs and aesthetics, as well as public perception.	<b>Human Need:</b> Both non-potable and IPR provide water to the community, but an IPR project distributes purified water to a greater number of people. <b>Public Perception:</b> Non-potable uses are highly supported based on the findings of the Study's public outreach efforts, but IPR projects are not as high.
Environmental Value	To enhance, develop or improve local habitat or ecosystems and avoid or minimize negative environmental impacts. Comparison of environmental impacts and/or enhancements, environmental impacts avoided, and permits are required.	Offsets discharge of wastewater to the ocean. Negative environmental impacts due to construction are temporary. Wetlands associated with an IPR project are generally acceptable to environmentalists..
Local Water Reliability	To substantially increase the percentage of water supply that comes from water reuse, thereby offsetting the need for imported water. Increases percent of water recycling and improves local reliability.	Up to <b>12,660 AFY</b> of recycled water is used in this strategy. Including advanced treatment process uses for the IPR components, the complete strategy utilizes approximately <b>96%</b> of the available recycled water from the SBWRP.
Water Quality	Meets or exceeds level of quality required for the intended use and customer needs; to meet all customer quality requirements.	Treatment methodology and monitoring will ensure appropriate water quality for intended uses: non-potable or indirect potable.
Technical Feasibility	To assess the physical implementation of the strategy.	The necessary facilities must be built in a timely and cost-effective manner.
Operational Reliability	To maximize ability of facilities to perform under a range of future conditions. Level of demand met and opportunities for system interconnections and operational flexibility are addressed.	An IPR project provides operational reliability as it takes full advantage of the redundancy of the City's potable water distribution system and increases the use of water produced at the City's water reclamation plant.
Cost	To minimize total cost to the community. Comparison of estimated capital improvement costs, operational costs, and revenues for each reuse opportunity, as well as comparison of estimated avoided costs such as future regional water and wastewater infrastructure costs and costs to develop alternative water supplies (e.g. desalination).	See Section 7.5 for Cost Discussion.
Ability to Implement	To evaluate viability or fatal flaws and assess political and public acceptability. Level of difficulty in physical, social or regulatory implementation.	An IPR project is anticipated to be more difficult to implement due to regulatory and social issues. Extensive public outreach efforts will be required to implement the IPR component of this strategy.

**Figure 7-14 SB-3 – Evaluation Criteria Detail**



## 7.5 Cost Evaluations

### Cost Evaluation Overview

As part of the Reuse Study, costs the City would incur for each of the six strategies, and for every step of each strategy, were evaluated. All costs are presented on a common basis in 2005 dollars<sup>2</sup>. This report highlights three key measures of project costs:

- **Capital Costs:** Capital costs are an estimate of the City's initial capital outlay for project construction and implementation exclusive of operations and maintenance costs. These costs include all costs for project planning, permitting, design, construction, and construction administration.
- **Unit Costs:** The unit cost of water delivered provides a common basis for comparison among projects with differing reuse volumes. The analysis is based on the total equivalent annual cost of each project, including capital and operating costs. Capital costs are amortized over a 40-year term at an interest rate of 6 percent. The 40-year term is representative of the average economic life of the mix of capital facilities presented. Unit costs are then calculated by dividing total equivalent annual costs by the annual volume of recycled water put to beneficial use. Finally, the resulting value is adjusted to account for various incentive credits and avoided costs, as described later in this section.
- **Impact on Typical Monthly Residential Water Bill:** This measure is an estimate of the impact on a typical monthly City residential water bill necessary to fund the reuse projects over a 40-year finance period. The actual rate effect may vary due to differences in financing, funding grants, and other factors, but this measure nevertheless provides a reasonable estimate for evaluation and comparison purposes.

As with the other evaluations presented in this section, this cost evaluation data is intended to help inform the Council, stakeholders, and the public regarding the City's decisions of which strategy to pursue and how far the strategy should be pursued. While costs are a key evaluation factor, as noted in the preface of this report, there may be other factors that could lead the City to select a more costly alternative over a less costly one. In addition, the City fully intends to pursue State and local grant funding for any options selected or decided upon by the Council. The costs presented herein do not reflect or assume grant funding.

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<sup>2</sup> Construction costs are referenced to an Engineering News Record Los Angeles Construction Cost Index of 8193 (January 2005).



### Cost Evaluations – North City Strategies

Reuse volumes, capital costs, unit costs, and rate effects for each phase of the three North City strategies are summarized below.

North City water reuse volumes are shown in **Table 7-3**, along with the total annual volume, in acre feet, of recycled water used for each strategy. There are three section headings: (1) “Incremental Use of New Projects” lists the amount of new recycled water added by new projects within a particular step; (2) “Cumulative Use of New Projects” lists the total volume of recycled water added by all of the new projects; and (3) “Cumulative Total Use of New and Existing Projects” lists the total volume of reuse of all the new and existing projects.

**Table 7-3**  
**North City Reuse Volumes (AFY)**

Strategy	Step 1	Step 2	Step 3	Step 4
<i>Incremental Use of New Projects</i>				
NC-1	3,820	2,110	1,120	3,190
NC-2	3,820	2,110	1,800	870
NC-3	3,820	10,500	-	-
<i>Cumulative Use of New Projects</i>				
NC-1	3,820	5,930	7,050	10,240
NC-2	3,820	5,930	7,730	8,600
NC-3	3,820	14,320	-	-
<i>Cumulative Total Use of New and Existing Projects</i>				
NC-1	13,260	15,370	16,490	19,680
NC-2	13,260	15,370	17,170	18,040
NC-3	13,260	23,760	-	-

Note: Refer to Figures 7-3 through 7-5 on preceding pages for components included in each step.



**Table 7-4** summarizes the capital costs for the new North City projects in 2005 dollars. There are two section headings: (1) “Incremental Cost of New Projects” lists the additional capital costs added by new projects within a particular step; and (2) “Cumulative Cost of New Projects” lists the total capital costs added by all of the new projects up to a given step.

**Table 7-4  
North City Capital Costs**

Strategy	Step 1	Step 2	Step 3	Step 4
<i>Incremental Costs of New Projects</i>				
NC-1	\$27,600,000	\$50,400,000	\$65,100,000	\$141,600,000
NC-2	\$27,600,000	\$50,400,000	\$65,100,000	\$45,200,000
NC-3	\$27,600,000	\$210,000,000	-	-
<i>Cumulative Costs of New Projects</i>				
NC-1	\$27,600,000	\$78,000,000	\$143,100,000	\$284,700,000
NC-2	\$27,600,000	\$78,000,000	\$143,100,000	\$188,300,000
NC-3	\$27,600,000	\$237,600,000	-	-

Unit costs for the new North City projects in dollars per acre-foot are summarized in **Table 7-5**, based on a 40-year term at 6-percent interest. There are two section headings: 1) “Incremental Unit Costs of New Projects” lists the individual unit costs of each new project addition; and 2) “Melded Unit Costs of New Projects” lists the weighted average or melded unit costs of all of the new projects up to a given step.

**Table 7-5  
North City Unit Costs (\$/AF)**

Strategy	Step 1	Step 2	Step 3	Step 4
<i>Incremental Unit Costs of New Projects</i>				
NC-1	\$130	\$2,100	\$5,240	\$2,910
NC-2	\$130	\$2,100	\$2,330	\$3,060
NC-3	\$130	\$1,630	-	-
<i>Melded Unit Costs of New Projects</i>				
NC-1	\$130	\$830	\$1,530	\$1,960
NC-2	\$130	\$830	\$1,180	\$1,370
NC-3	\$130	\$1,230	-	-



**Table 7-6** presents the approximate increase to a typical monthly residential water bill that would be necessary to fund each strategy. There are two section headings: (1) “Incremental Effect of New Projects” lists the individual rate effect of each new project addition; and (2) “Cumulative Effect of New Projects” lists the cumulative or total rate effect of all of the new projects up to a given step.

**Table 7-6**  
**North City Estimated Monthly Rate Increase to**  
**Typical Residential Water Bill (\$/mo)**

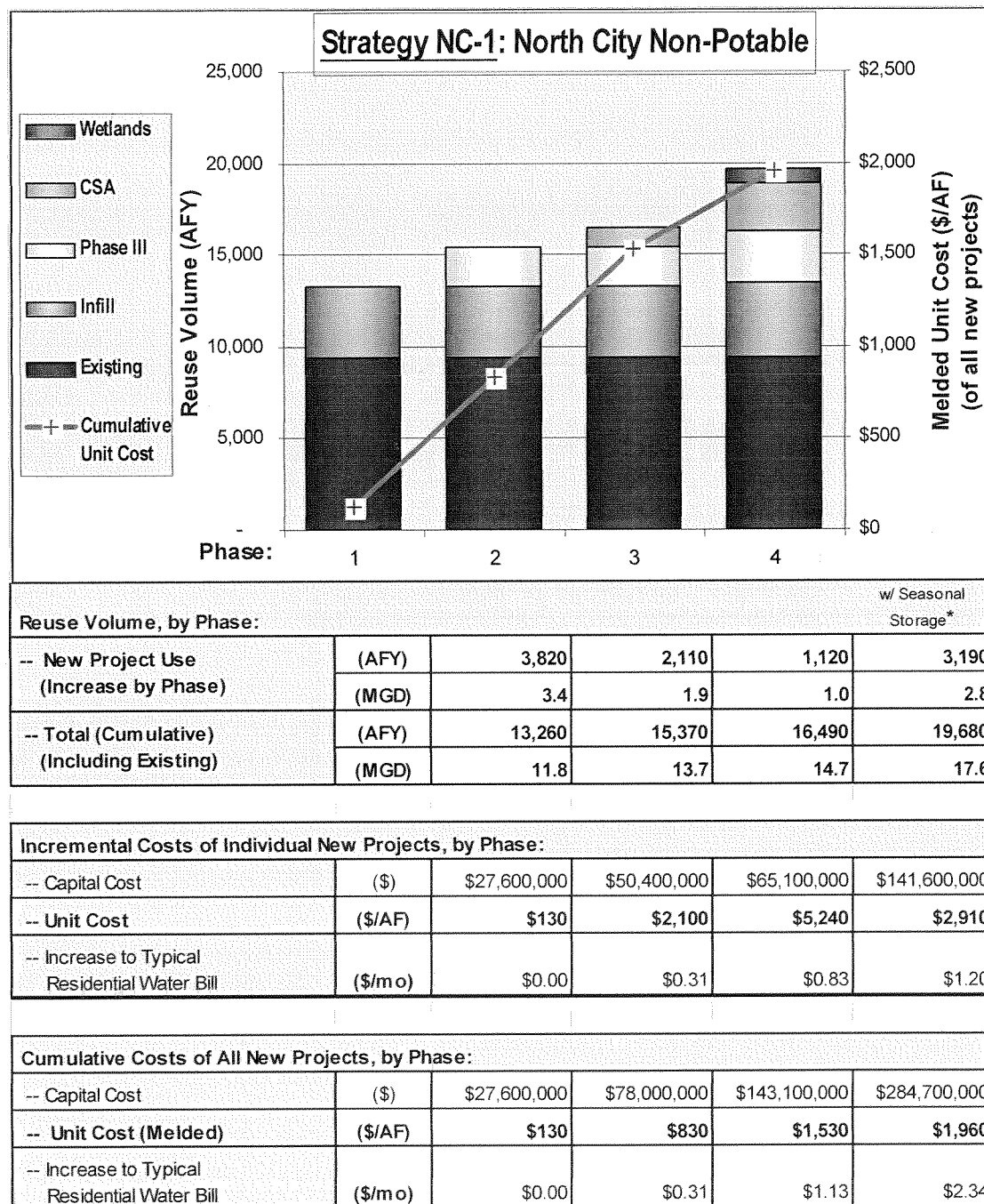
Strategy	Step 1*	Step 2	Step 3	Step 4
<i>Incremental Effect of New Projects</i>				
NC-1	\$0	\$0.53	\$0.83	\$1.20
NC-2	\$0	\$0.53	\$0.52	\$0.35
NC-3	\$0	\$1.85	-	-
<i>Cumulative Effect of New Projects</i>				
NC-1	\$0	\$0.31	\$1.13	\$2.34
NC-2	\$0	\$0.31	\$0.82	\$1.17
NC-3	\$0	\$1.63	-	-

\* Increased revenue from new customers are projected to offset the cost for this step.

Volume and cost data specific to each strategy are also presented in **Figures 7-3, 7-4, and 7-5** for strategies NC-1, NC-2, and NC-3, respectively. These cost charts provide a graphical representation of costs in relation to the steps and reuse volume of each strategy. In the graph, the columns represent the individual project opportunities in each strategy. The legend to the left of the columns identifies each project. The height of the column is the volume of reuse, measured on the left axis labeled “Reuse (AFY)”. The graphed line overlapping the columns represents the cumulative unit cost per step, measured on the right axis labeled “Average Cost per AF (for new projects).”



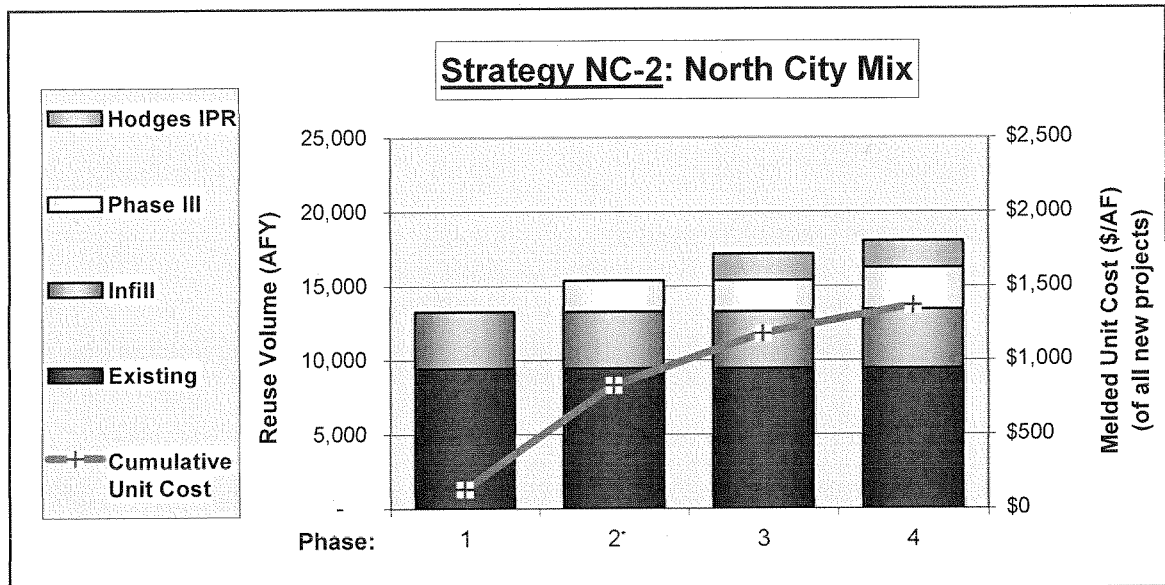
The tabular data below the graph includes reuse volumes, capital costs, unit costs, and the effect of the projects on a typical monthly residential water bill. The costs and the “new increment” reuse volumes shown in the supporting tables reflect new projects only, exclusive of existing projects such as the City's Phase I and Phase II North City distribution system expansions.



**Figure 7-15 – Volume and Cost Summary for Strategy NC-1**

\* As NCWRP inflow volume increases over time, reuse volume will correspondingly increase.





Reuse Volume, by Phase:					w/ Seasonal Storage*
-- New Project Use (Increase by Phase)	(AFY)	3,820	2,110	1,800	870
	(MGD)	3.4	1.9	1.6	0.8
-- Total (Cumulative) (Including Existing)	(AFY)	13,260	15,370	17,170	18,040
	(MGD)	11.8	13.7	15.3	16.1

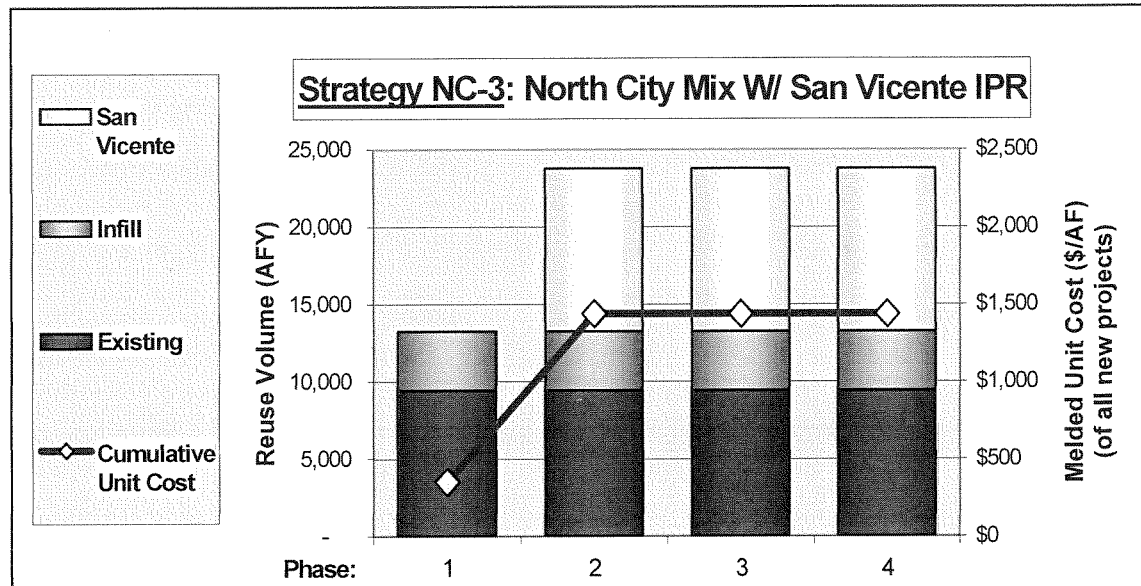
Incremental Costs of Individual New Projects, by Phase:					
-- Capital Cost	(\$)	\$27,600,000	\$50,400,000	\$65,100,000	\$45,200,000
-- Unit Cost	(\$/AF)	\$130	\$2,100	\$2,330	\$3,060
-- Increase to Typical Residential Water Bill	(\$/mo)	\$0.00	\$0.31	\$0.52	\$0.35

Cumulative Costs of All New Projects, by Phase:					
-- Capital Cost	(\$)	\$27,600,000	\$78,000,000	\$143,100,000	\$188,300,000
-- Unit Cost (Melded)	(\$/AF)	\$130	\$830	\$1,180	\$1,370
-- Increase to Typical Residential Water Bill	(\$/mo)	\$0.00	\$0.31	\$0.82	\$1.17

**Figure 7-16 – Volume and Cost Summary for Strategy NC-2**

\* As NCWRP inflow volume increases over time, reuse volume will correspondingly increase.





Reuse Volume, by Phase:				
– New Project Use (Increase by Phase)	(AFY)	3,820	10,500	0
	(MGD)	3.4	9.4	0.0
– Total (Cumulative) (Including Existing)	(AFY)	13,260	23,760	23,760
	(MGD)	11.8	21.2	21.2

Incremental Costs of Individual New Projects, by Phase:				
– Capital Cost	(\$)	\$27,600,000	\$210,000,000	-
– Unit Cost	(\$/AF)	\$130	\$1,630	-
– Increase to Typical Residential Water Bill	(\$/mo)	\$0.00	\$1.63	-

Cumulative Costs of All New Projects, by Phase:				
– Capital Cost	(\$)	\$27,600,000	\$237,600,000	\$237,600,000
– Unit Cost (Melded)	(\$/AF)	\$130	\$1,230	\$1,230
– Increase to Typical Residential Water Bill	(\$/mo)	\$0.00	\$1.63	\$1.63

**Figure 7-17 – Volume and Cost Summary for Strategy NC-3**

\* As NCWRP inflow volume increases over time, reuse volume will correspondingly increase.



## Cost Evaluations – South Bay Strategies

Reuse volumes, capital costs, unit costs, and rate effects for each step of the three South Bay strategies are summarized below.

South Bay water reuse volumes are shown in **Table 7-7**, along with the total annual volume, in acre-feet, of recycled water that is used for each strategy. There are three section headings: (1) “Incremental Use of New Projects” lists the amount of new recycled water added by new projects within a particular step; (2) “Cumulative Use of New Projects” lists the total volume of recycled water added by all of the new projects; and (3) “Cumulative Total Use of New and Existing Projects” lists the total volume of reuse of all the new and existing projects.

**Table 7-7**  
**South Bay Reuse Volumes (AFY)**

Strategy	Step 1	Step 2	Step 3	Step 4
<i>Incremental Use of New Projects</i>				
SB-1	0	2,860	4,990	450
SB-2	1,800	1,260	710	450
SB-3	0	6,760	710	450
<i>Cumulative Use of New Projects</i>				
SB-1	0	1,600	5,880	-
SB-2	1,800	1,800	1,800	-
SB-3	0	5,500	5,500	-
<i>Cumulative Total Use of New and Existing Projects (Including OWD)</i>				
SB-1	4,740	7,600	12,590	13,040
SB-2	6,540	7,800	8,510	8,960
SB-3	4,740	11,500	12,210	12,660



**Table 7-8** summarizes the capital costs of the new South Bay projects in 2005 dollars. There are two section headings: (1) “Incremental Cost of New Projects” lists the additional capital costs added by new projects within a particular step; and (2) “Cumulative Cost of New Projects” lists the total capital costs added by all of the new projects up to a given step.

**Table 7-8  
South Bay Capital Costs**

Strategy	Step 1	Step 2	Step 3	Step 4
<i>Incremental Costs of New Projects</i>				
SB-1*	\$0	\$1,000,000	-	-
SB-2	\$21,600,000	-	-	-
SB-3	\$0	\$96,100,000	-	-
<i>Cumulative Costs of New Projects</i>				
SB-1*	\$0	\$1,000,000	-	-
SB-2	\$21,600,000	-	-	-
SB-3	\$0	\$96,100,000	-	-

\* Increased revenue from new customers are projected to offset the cost for this step.

Unit costs of the new South Bay projects in dollars per acre-foot are summarized in **Table 7-9**, based on a 40 year term at 6-percent interest. There are two section headings: (1) “Incremental Unit Costs of New Projects” lists the individual unit costs of each new project addition; and (2) “Melded Unit Costs of New Projects” lists the weighted average or melded unit costs of all of the new projects up to a given step.

**Table 7-9  
South Bay Unit Costs (\$/AF)**

Strategy	Step 1	Step 2	Step 3	Step 4
<i>Incremental Unit Costs of New Projects</i>				
SB-1*	\$0	\$50	-	-
SB-2	\$1,330	-	-	-
SB-3	\$0	\$1,530	-	-
<i>Melded Unit Costs of New Projects</i>				
SB-1*	\$0	\$70	-	-
SB-2	\$1,330	-	-	-
SB-3	\$0	\$1,530	-	-

Note: Refer to Figure 7-6 through 7-8 on succeeding pages for components included in each step.

\* Increased revenue from new customers are projected to offset the cost for this step.



**Table 7-10** presents the projected increase to a typical monthly residential water bill that would be necessary to fund each strategy. There are two section headings: (1) “Incremental Effect of New Projects” lists the individual rate effect of each new project addition; and (2) “Cumulative Effect of New Projects” lists the cumulative or total rate effect of all of the new projects up to a given step.

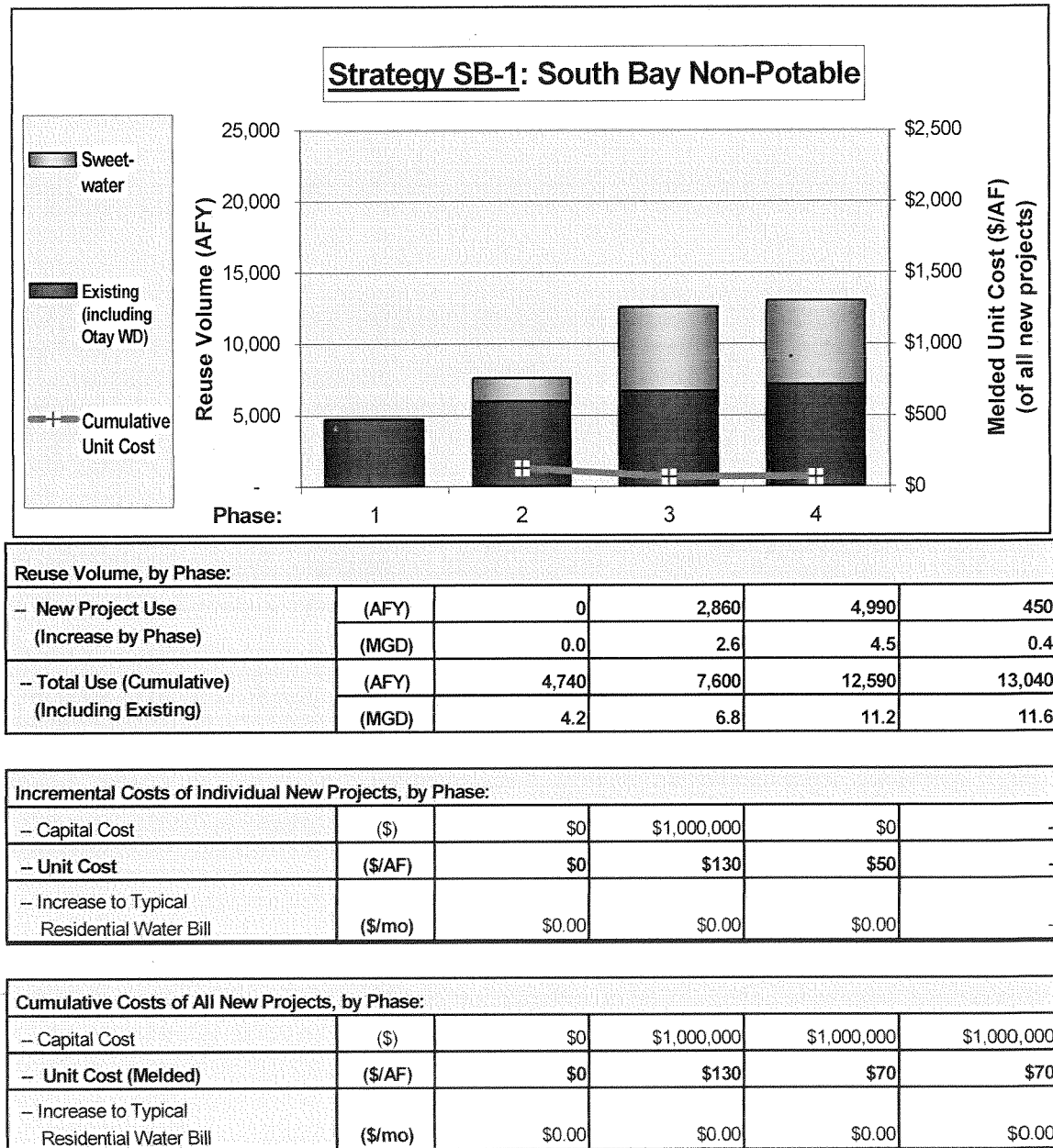
**Table 7-10**  
**South Bay Estimated Monthly Rate Increase to**  
**Typical Residential Water Bill (\$/mo)**

Strategy	Step 1	Step 2	Step 3	Step 4
<i>Incremental Effect of New Projects</i>				
SB-1	\$0.00	\$0.00	-	-
SB-2	\$0.23	-	-	-
SB-3	\$0.00	\$0.89	-	-
<i>Cumulative Effect of New Projects</i>				
SB-1	\$0.00	\$0.00	-	-
SB-2	\$0.23	-	-	-
SB-3	\$0.00	\$0.89	-	-

Volume and cost data specific to each strategy are also presented in **Figures 7-6, 7-7, and 7-8** for strategies SB-1, SB-2, and SB-3, respectively. These cost charts provide a graphical representation of costs in relation to the steps and reuse volume of each strategy. In the graph, the columns represent the individual project opportunities in each strategy. The legend to the left of the columns identifies each project. The height of the column is the volume of reuse, measured on the left axis labeled “Reuse (AFY)”. The graphed line overlapping the columns represents the cumulative unit cost per step, measured on the right axis labeled “Average Cost per AF (for new projects).”



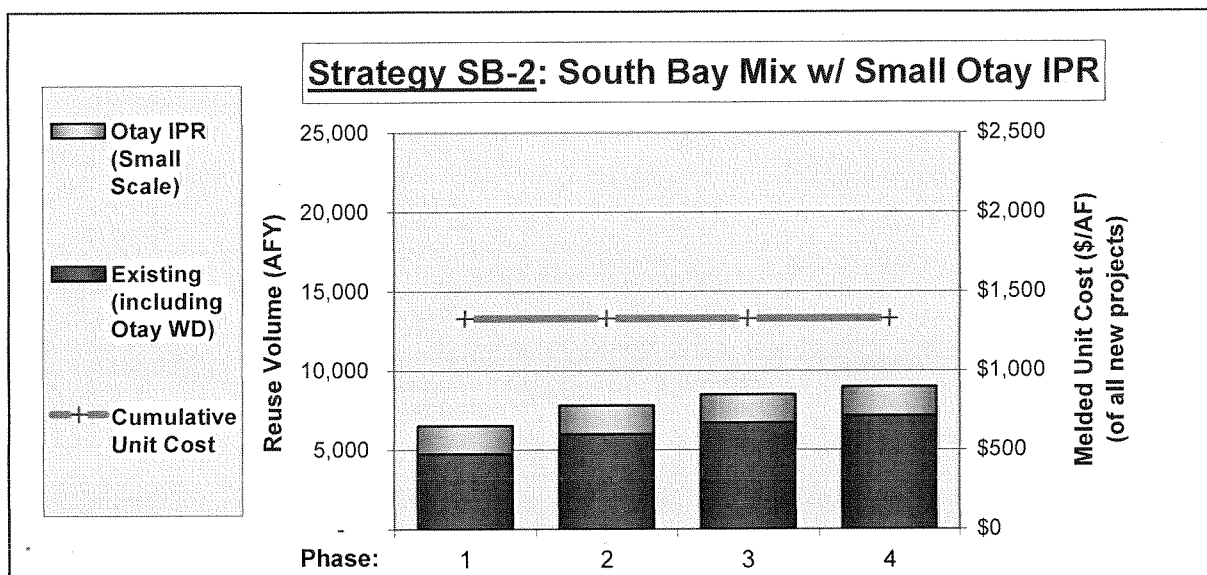
The tabular data below the graph includes reuse volumes, capital costs, unit costs, and the effect of the projects on a typical monthly residential water bill. The costs and the “new increment” reuse volumes shown in the supporting tables reflect new projects only, exclusive of existing projects such as sales to the OWD.



**Figure 7-18 – Volume and Cost Summary for Strategy SB-1**

\* As SBWRP inflow volume increases over time, reuse volume will correspondingly increase.





Reuse Volume, by Phase:					
-- New Project Use (Increase by Phase)	(AFY)	1,800	1,260	710	450
	(MGD)	1.6	1.1	0.6	0.4
-- Total (Cumulative) (Including Existing)	(AFY)	6,540	7,800	8,510	8,960
	(MGD)	5.8	7.0	7.6	8.0

Incremental Costs of Individual New Projects, by Phase:					
-- Capital Cost	(\$)	\$21,600,000	-	-	-
-- Unit Cost	(\$/AF)	\$1,330	-	-	-
-- Increase to Typical Residential Water Bill	(\$/mo)	\$0.23	-	-	-

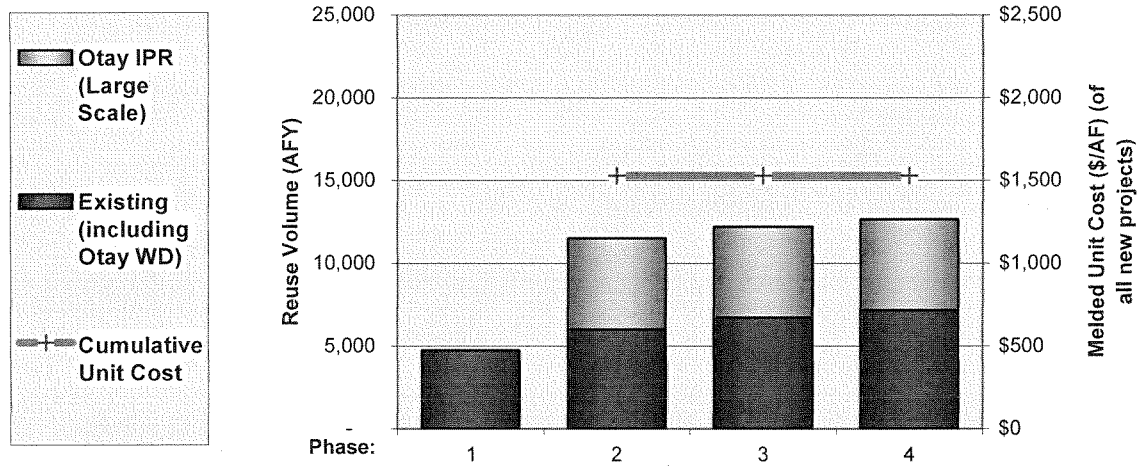
Cumulative Costs of All New Projects, by Phase:					
-- Capital Cost	(\$)	\$21,600,000	\$21,600,000	\$21,600,000	\$21,600,000
-- Unit Cost (Melded)	(\$/AF)	\$1,330	\$1,330	\$1,330	\$1,330
-- Increase to Typical Residential Water Bill	(\$/mo)	\$0.23	\$0.23	\$0.23	\$0.23

**Figure 7-19 – Volume and Cost Summary for Strategy SB-2**

\* As SBWRP inflow volume increases over time, reuse volume will correspondingly increase.



### Strategy SB-3: South Bay Mix w/ Full-Scale Otay IPR



Reuse Volume, by Phase:					
-- New Project Use (Increase by Phase)	(AFY)	0	6,760	710	450
	(MGD)	0.0	6.0	0.6	0.4
-- Total (Cumulative) (Including Existing)	(AFY)	4,740	11,500	12,210	12,660
	(MGD)	4.2	10.3	10.9	11.3

Incremental Costs of Individual New Projects, by Phase:					
-- Capital Cost	(\$)	\$0	\$96,100,000	-	-
-- Unit Cost	(\$/AF)	\$0	\$1,530	-	-
-- Increase to Typical Residential Water Bill	(\$/mo)	\$0.00	\$0.89	-	-

Cumulative Costs of All New Projects, by Phase:					
-- Capital Cost	(\$)	\$0	\$96,100,000	\$96,100,000	\$96,100,000
-- Unit Cost (Melded)	(\$/AF)	\$0	\$1,530	\$1,530	\$1,530
-- Increase to Typical Residential Water Bill	(\$/mo)	\$0.00	\$0.89	\$0.89	\$0.89

Figure 7-20 – Volume and Cost Summary for Strategy SB-3

\* As SBWRP inflow volume increases over time, reuse volume will correspondingly increase.



### **Incentive Credits and Avoided Costs**

The actual cost of each alternative implementation strategy to the City will likely be, in most cases, less than the straight sum of the component project capital and operating costs. Two factors that could contribute to this cost reduction are:

- **Incentive Credits:** The first factor that could reduce the City's cost is the availability of incentive credits for water reuse projects. These monetary credits are provided by the MWD and the Water Authority as a means of promoting the development of water reuse and other alternative local water supply projects.
- **Avoided Costs:** The second factor that could reduce the City's cost for water reuse projects is the potential for these projects to offset other water and wastewater capital and operating costs that the City would otherwise incur. Economists call such cost offsets avoided costs. Avoided costs can be credited to the cost of the water reuse project, reducing its effective cost to the City as a whole. Some avoided costs are *direct* cost offsets, in that they place real dollars in the City's accounts concurrent with the operation of the project. Other avoided costs are *indirect* cost offsets, in that they avoid or lessen the need for some possible future project, or provide other benefits that do not directly put real dollars in the City's accounts.

Reuse credits and avoided costs are summarized in **Tables 7-11** and **7-12**. **Table 7-11** describes each credit or avoided cost factor, and **Table 7-12** summarizes the net dollar effect for each of several categories of projects. These credits and avoided costs are factored into the unit cost and rate effect data presented in the previous cost tables and figures.



**Table 7-11**  
**Summary of Reuse Incentive Credits and Avoided Costs**

Cost Component	Description	Dollar Amount	Direct or Indirect?
<b>Incentive Credits:</b>			
1. Water Authority Credit	Financial incentive program by Water Authority. Designed to encourage development of reuse projects.	<b>\$100/AF savings,</b> all projects	Direct
2. MWDSC Credit	Financial incentive program by the MWD. Credit amount is per the City's agreement with Metropolitan.	<b>\$250/AF savings,</b> all projects except wetlands and sales to other agencies	Direct
<b>Avoided Facility Operating and Capital Costs:</b>			
3. Avoided Wastewater Operating Costs	The NCWRP reduces the plant's discharges to Point Loma, saving operations costs to and through Point Loma. No similar savings accrue at the SBWRP because the facility has its own ocean outfall.	<b>\$60/AF savings,</b> all North City projects	Direct
4. Incurred Wastewater Operating Costs	To produce recycled water, the City incurs additional operating costs to operate the tertiary filters at both the NCWRP and SBWRP, and also the demineralization facility at the NCWRP. The latter does not apply for reservoir augmentation projects.	<b>\$100/AF cost,</b> all North City except reservoir augmentation (IPR) <b>\$50/AF cost,</b> all other	Direct
5. Avoided Wastewater Capital Costs	At the NCWRP, recycled water put to beneficial use reduces the wastewater inflow to Point Loma. However, this does not offset any capital costs because the City is required to maintain full wet-weather backup flow disposal capacity to convey NCWRP flows to Point Loma. At the SBWRP, recycled water reduces the flow of treated wastewater out the ocean outfall, but does not offset any capital costs.	<b>\$0/AF savings,</b> all projects	Indirect
6. Avoided Water Treatment Plant Capital Costs	Some projects may offset the need for the City to expand its water treatment plants, or may allow existing plants to treat a higher percentage of the City's total potable supply. Eligible projects are all types except wetlands creation, which does not offset a potable water demand, and reservoir augmentation, which does not reduce water treatment plant capacity requirements.  At the NCWRP, existing and planned summertime uses already utilize approximately 18 MGD of the plant's 24 MGD capacity. Thus the potential treatment plant cost offset for new projects is limited to the remaining 6 MGD of capacity. At the SBWRP, all of the contemplated new uses are either uses outside the City, or are Reservoir Augmentation projects, and do not offset any City treatment plant costs.  Based on the City's actual costs to expand the Miramar Filtration Plant (\$167,000,000 for 75 MGD), the City values treatment capacity at approximately \$2,200,000 per MGD.	<b>\$2,200,000 savings per MGD of summertime use,</b> first 6 MGD of additional qualifying North City summertime use	Indirect
7. IPR Water Quality Benefit	IPR projects will produce water that has a lower TDS concentration than existing imported water supplies. This reduction assists the City with water reclamation efforts and groundwater management efforts by reducing the need for expensive demineralization processes, and benefits the City's customers by extending the life of water heaters and other household fixtures.  The value of this benefit has been estimated based on data from the 1999 Salinity Management Study (MWD, U.S. Bureau of Reclamation). The analysis assumes that IPR projects will produce water with a TDS approximately 400 mg/L less than imported water.	<b>\$200/AF savings,</b> All IPR projects	Indirect



**Table 7-12**  
**Summary of Cost Credits by Category of Reuse**

Cost Component	Direct / Indirect	Types and Locations of Reuse (\$/AF)						
		Recycled Supply from NCWRP				Recycled Supply from SBWRP		
		Title 22 (except wetlands)	Wetlands	Reservoir IPR	Ground-water IPR	Title 22	Sale to others (Title 22)	Reservoir IPR
1. SDCWA Credit	Direct	\$100	--	\$100	\$100	\$100	--	\$100
2. MWDSC Credit	Direct	\$250	--	\$250	\$250	\$250	--	\$250
3. Avoided Wastewater Operating Costs	Direct	\$60	\$60	\$60	\$60	--	--	--
4. Incurred Wastewater Operating Costs	Direct	(\$100)	(\$100)	(\$50)	(\$100)	(\$50)	(\$50)	(\$50)
5. Avoided Wastewater Capital Costs	Indirect	--	--	--	--	--	--	--
6. Avoided Water Treatment Plant Capital Costs	Indirect	\$13 M capital credit to first 6 MGD of new reuse	--	--	--	--	--	--
7. IPR Water Quality Benefit	Indirect	--	--	\$200	\$200	--	--	\$200
TOTALS – DIRECT:		\$310	(\$40)	\$360	\$310	\$300	\$(50)	\$300
TOTALS – INDIRECT:		See No. 6 credit	--	\$200	\$200	--	--	\$200

### **Cost Considerations Regarding Supplemental Water or Seasonal Storage to Meet Peak Summer Demands**

*To meet peak summer demands, some strategies require either supplemental purchases of imported water, or seasonal storage. These are factored into the summary cost tables earlier in this section.*

In some of the strategies, the summertime peak demand for recycled water exceeds the recycled water production capacity of the corresponding water reclamation plant. When this peak demand occurs, the cost tables and figures presented earlier in this section include the costs for the City to do one of two things:

**Supplement:** One option is to supplement the recycled water supply with purchased imported water. This option does not maximize the volume of water reused, but is generally less expensive than providing seasonal storage, even after accounting for water purchases as an operating cost of the strategy.

**Seasonal Storage:** The other option is to provide seasonal storage. This option maximizes the volume of water reused, but is generally more expensive than supplementing with imported water.



Because of the high cost of seasonal storage, that option has been deferred until the last steps of the implementation strategies. Should less expensive seasonal storage opportunities become available to the City, or should summer peak demands turn out to be different than forecasted, the City could re-evaluate this decision. The cost tables and figures presented earlier in this section include the costs for supplemental water purchases or seasonal storage as required.

### **Comparison of Water Reuse Project Costs with Other Sources of New Water**

One of the main benefits of developing additional uses of recycled water is that these uses help to reduce the City's need to purchase imported water or to develop other water supplies to meet its growing demands. Every acre-foot of beneficially used recycled water is an acre-foot of imported water that the City does not need to purchase. Other water supplies include imported water, seawater desalination and water transfers.

The City purchases imported water from the Water Authority, which in turn purchases a majority of its water from the MWD. The Water Authority's current treated water rates are \$526 for treated municipal and industrial (M&I) water, consisting of a \$431/AF MWD cost of supply, and a \$95/AF Water Authority charge. Untreated M&I water rates are \$444/AF, consisting of the \$349/AF MWD untreated rate, and a \$95/AF Water Authority charge.

The City mostly purchases untreated water, at a current price of \$444/AF, and treats this water at its own treatment plants prior to distribution to customers. Accounting for costs to operate the treatment plant, the City's current average cost to purchase and treat water is approximately **\$500/AF**.

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*The City's current average cost to purchase and treat water is approximately \$500/AF.*

---

In their efforts to serve increasing demands, both the Water Authority and MWD are pursuing new sources of supply, including seawater desalination and water transfers. These new supplies are often more expensive than existing supplies, and as such may represent the true marginal cost of water, and the more appropriate point of comparison for water reuse costs.

**Seawater Desalination:** Continued improvements in desalination technology have lowered costs to the point that many water agencies up and down the coast of California are evaluating seawater desalination projects as a possible means of supplementing their water supplies. Locally, the Water Authority is continuing to investigate the possibility of building a 50 MGD or larger seawater desalination facility at the Cabrillo power plant in Carlsbad. This proposed facility can be used as a basis for estimating the unit costs of desalination.

The Carlsbad project, as currently proposed, would involve the construction and operation of a desalination plant by a private developer. In 2003, the developer offered to sell water from the proposed plant to the Water Authority for a set price of slightly less than \$800/AF, exclusive of conveyance, and with the price indexed to several factors, (including power costs) to provide mechanisms for escalation. Since that time, the Water Authority and the plant developer have had difficulty agreeing on the actual terms of the agreement, and the project remains in the negotiating stage. Accounting for construction price inflation over the past two years, and accounting for the negotiating difficulties encountered to date, it is reasonable to assume that the 2005 price for a project agreement

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*A reasonable comparative cost for seawater desalination in San Diego County is approximately \$1,400/AF.*

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acceptable to both the developer and the Water Authority will be approximately \$1,000 to \$1,100/AF, exclusive of conveyance. Based on capital and operating cost numbers reported by the Water Authority in their preliminary analysis of project conveyance facilities, the unit cost of conveying this water back to the Water Authority aqueduct system would be approximately \$300 to \$400/AF. Combining the average estimates for treatment and conveyance, a reasonable comparative cost for seawater desalination in San Diego County is approximately **\$1,400/AF**. This figure does not include any incentives, grants or credits.

**Water Transfers:** In 2003, the Water Authority completed its efforts to secure a long-term water transfer agreement with the IID. The agreement provides for IID to transfer 200,000 AFY of water to the Water Authority, starting with 20,000 AF in 2004 and ramping up to the full 200,000 AF over the course of approximately ten years. As part of the overall package of implementing agreements, the Water Authority also obtained rights to approximately 77,000 AFY of water that will be conserved by the lining of the All American and Coachella Canals. The Water Authority estimates that its current cost of transferred water, before treatment, is \$534/AF. The Water Authority is also incurring related project costs for mitigation of project environmental and socioeconomic effects in the Imperial Valley. In addition, over the long-term the Water Authority will incur additional costs to provide the transmission capacity to deliver this water to San Diego County. Finally, the City will incur additional costs to treat this water at one of the City's water treatment plants. Accounting for these additional project costs, the Study suggests that a reasonable comparative cost for water transfers in San Diego County is approximately **\$800/AF**.

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*A reasonable comparative cost for water transfer costs is approximately \$800/AF.*

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## 7.6 Evaluation Summary

The principal findings from the preceding evaluations of the six strategy alternatives are as follows:

1. **All of the presented alternatives are feasible.** For both the North City and South Bay systems, there is a range of reuse strategies that are feasible from an engineering, scientific, and regulatory perspective. For the IPR strategies, public acceptance will depend on the City's commitment and ability to garner public support through an extensive public involvement program.
2. **The City faces choices between non-potable and indirect-potable uses.** The strategies differ in their type of use, specifically, between those that exclusively pursue non-potable uses and those that include IPR. In deciding which strategies to pursue, the City will need to weigh the merits of each type of use.
3. **The City faces choices in deciding how far to pursue a selected strategy.** Within each strategy, there are implementation steps that add new units of use, usually at progressively higher and higher incremental costs. In deciding how far along each strategy to advance, the City will need to weigh these costs with water supply reliability, sustainability, and other values suggested in the preface of this report.



#### 4. Specific North City strategy findings include:

- **NC-1** has the lowest initial capital cost and lowest unit cost of all North City strategies through the second step of the strategy. However, if the desire is to fully maximize use of the available recycled water supply, subsequent steps have higher unit costs and make this alternative comparatively more expensive. This strategy appears to be the appropriate choice if the driving decision factors are to minimize initial capital outlays and to commit to a non-potable reuse approach.
- **NC-2** includes the opportunity to switch from non-potable to IPR. This strategy appears to be the appropriate choice if the driving decision factor is to minimize initial expenditures, while still having the ability to accomplish an IPR project.
- **NC-3** maximizes the available North City water supply in one step through IPR. For a strategy that fully maximizes use of the available recycled water supply, it provides the lowest overall unit cost. However, this strategy has the highest initial capital costs. This strategy appears to be the appropriate choice if the driving decision factors are to maximize recycled water use and have the lowest ultimate unit cost.

#### 5. Specific South Bay strategy findings include:

- **SB-1** has the lowest initial capital cost and lowest unit cost of all South Bay strategies. This strategy appears to be the appropriate choice if the driving decision factor is to minimize expenditures, even if the use occurs outside City service areas.
- **SB-2** includes a mix of non-potable uses and a small-scale IPR project. This strategy appears to be an appropriate choice either if the driving decision factor is to retain use of the South Bay recycled water within the City, or if the projected non-potable uses envisioned in strategy SB-1 do not come to fruition.
- **SB-3** includes a mix of non-potable uses and a large-scale IPR project. This strategy appears to be an appropriate choice either if the driving decision factor is to retain use of the South Bay recycled water within the City, or if the projected non-potable uses envisioned in strategy SB-1 do not come to fruition.

## 7.7 Next Steps

This Study simply assesses the advantages, constraints, and values of the different water reuse opportunities available to the City. The Study does not seek to recommend a specific strategy.

This report was reviewed by the Assembly and the IAP. Both of these groups have issued written statements commenting on the Study's analysis and findings, and are included as Appendices B, C and E.



This report was presented to the PUAC on August 21<sup>st</sup>, 2005; their resolution has been included as Appendix D. The Study will be presented to the City's Natural Resources and Culture Committee and subsequently to Council for their consideration and direction as to the City's future course of water reuse development.



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Directions							

**PRESS RELEASE**  
**FOR IMMEDIATE RELEASE:**

CONTACT: ASSOCIATION OF CONCERNED TAXPAYERS MAZZARELLA, DUNWOODY, & CALDARELLI LLP  
 CONTACT PERSON BRUCE HENDERSON MARK C. MAZZARELLA

VOICE PHONE NUMBER: 858 273-8600 (619) 238-4900

EMAIL ADDRESS REACHACT@AOL.COM <MAILTO:REACHACT@AOL.COM>  
MMAZZARELLA@MDCLAW.COM <MAILTO:MMAZZARELLA@MDCLAW.COM>

PRESS CONFERENCE TO BE HELD TODAY AT 1:30 P.M. IN FRONT OF THE WATER FOUNTAIN AT GOLDEN HALL, 202 C STREET, SAN DIEGO.

**NEW SUIT SEEKS TO STOP CITY OF SAN DIEGO WATER AND WASTE WATER DEPARTMENTS FROM FLUSHING AS MUCH AS \$2 BILLION ON TOILET-TO-TAP PROGRAM**

SAN DIEGO, CALIFORNIA, NOVEMBER 22, 2005. GOVERNMENT WASTE HATERS AND TAXPAYER ADVOCATES, STEVEN CURRIE AND THE ASSOCIATION OF CONCERNED TAXPAYERS, TODAY FILED A TAXPAYERS' LAWSUIT TO STOP THE CITY OF SAN DIEGO STAFF FROM FLUSHING AS MUCH AS \$2 BILLION MORE DOWN THE DRAIN IN PURSUIT OF THEIR EXPENSIVE, UNPROVEN, UNSAFE AND IMPRACTICAL TOILET-TO-TAP PROGRAM. FOR ALMOST A DECADE THE TOILET-TO-TAP PROGRAM HAS BEEN THE PET PROJECT OF CITY WATER AND WASTEWATER DEPARTMENTS STAFF WHO HAVE ADVOCATED THE CREATION OF A ONE TO TWO BILLION DOLLAR SEWER TO RESERVOIR TO DRINKING WATER NETWORK OF UNDERGROUND PIPES AND TREATMENT FACILITIES THROUGHOUT THE COUNTY. NOTWITHSTANDING CITY STAFF'S PERSISTENCE, TOILET-TO-TAP HAS BEEN SOUNDLY REJECTED BY THE PUBLIC AND BY THE CITY COUNCIL. IN 1999, AFTER REVIEWING THE AVAILABLE SCIENTIFIC LITERATURE ON THE SUBJECT, THE MOST THOROUGH OF WHICH CONCLUDED THAT TOILET-TO-TAP SHOULD BE VIEWED AS A LAST RESORT, THE SAN DIEGO CITY COUNCIL, BY RESOLUTION, DIRECTED STAFF NOT TO SPEND ANY MORE MONEY ON THE TOILET-TO-TAP PROGRAM UNTIL THE CITY COUNCIL DECIDED WHAT TO DO TO SATISFY THE CITY'S OBLIGATION PURSUANT TO STRINGENT FEDERAL REQUIREMENTS TO REUSE A LARGE PORTION OF ITS WASTEWATER. THE FEDERAL OCEAN POLLUTION REDUCTION ACT, JUST ONE OF MANY REGULATIONS DESIGNED TO FORCE SAN DIEGO TO RECYCLE THEIR WATER, REQUIRES THE CITY TO REUSE 45 MILLION GALLONS OF WASTEWATER PER DAY.

THE NEW SUIT, FILED BY MARK C. MAZZARELLA OF MAZZARELLA, DUNWOODY & CALDARELLI, ALLEGES THAT DESPITE THE CITY COUNCIL'S SPECIFIC DIRECTIVE,

Time Date  
1:30P 11/22/05  
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Location  
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STAFF CONTINUED TO WORK ON AND PROMOTE TOILET-TO-TAP, SECRETLY SPENDING MILLIONS OF DOLLARS ON THAT PROJECT, WHILE BILLING THOSE EXPENSES TO OTHER CITY WATER AND WASTEWATER PROJECTS. FURTHER, THE COMPLAINT ALLEGES THAT DESPITE BEING DIRECTED BY THE CITY COUNCIL, STAFF TWICE REFUSED TO SEEK OUTSIDE FUNDING FOR A "SHOWERS-TO-FLOWERS" PROGRAM TO EVALUATE WHETHER AN ALTERNATIVE PROPOSAL TO REUSE GREY WATER FROM WASHING MACHINES, SHOWERS AND NON-KITCHEN SINKS TO IRRIGATE LANDSCAPING, COULD MORE COST EFFECTIVELY SATISFY THE FEDERAL WATER REUSE REQUIREMENT. THE SUIT ALLEGES THAT STAFF THEN SURREPTITIOUSLY CREATED AN INTERNALLY FUNDED SHAM STUDY OF GREY WATER IRRIGATION SYSTEMS, WHICH WAS DESIGNED TO FAIL, AND HAVE CITED THAT ALLEGED FAILURE TO "PROVE" GREY WATER IRRIGATION SYSTEMS ARE NOT A VIABLE ALTERNATIVE TO TOILET-TO-TAP FOR THE CITY TO USE TO MEET THE FEDERAL WATER REUSE REQUIREMENT. THE SHOWERS-TO-FLOWERS GREY WATER IRRIGATION SYSTEMS DO NOT CONVERT SEWAGE INTO DRINKING WATER. RATHER, SEWAGE IS DISPOSED OF THROUGH THE CITY'S SEWER SYSTEM, WHILE THE WATER USED FOR SHOWERS, WASHING MACHINES AND BATHROOM SINKS IS DRAINED INTO A TANK, FILTERED AND PUMPED INTO UNDERGROUND IRRIGATION SYSTEMS THAT FURNISH WATER TO LAWNS AND OTHER LANDSCAPING. BECAUSE THE GREY WATER IRRIGATION SYSTEMS DO NOT REQUIRE CITY FUNDING, THE COST SAVINGS TO THE CITY FROM SHOWERS-TO-FLOWERS OVER TOILET-TO-TAP IS ABOUT \$2 BILLION OVER 30 YEARS.

IN ADDITION TO THE ACQUISITION OF LAND AND THE CONSTRUCTION OF ADDITIONS TO THE CITY'S EXISTING SEWER NETWORK, MUCH OF THE COST OF THE TOILET-TO-TAP PROGRAM WOULD INURE TO THE WATER AND WASTEWATER DEPARTMENT STAFF, WHO HAVE PROMOTED IT TO THE NEAR EXCLUSION OF OTHER ALTERNATIVES, IN THE FORM OF INCREASED COMPENSATION AND PENSION BENEFITS.

- END -

# Exhibit 36

1 MICHAEL J. AGUIRRE, City Attorney  
2 THOMAS C. ZELENY, Deputy City Attorney  
3 California State Bar No. 176280

4 Office of the City Attorney  
5 1200 Third Avenue, Suite 1100  
6 San Diego, California 92101-4100  
7 Telephone: (619) 533-5800  
8 Facsimile: (619) 533-5856

This document exempt from fees  
per Gov't Code § 6103 to the  
benefit of the City of San Diego

FILED  
Clerk of the Superior Court

JUL 06 2006

Attorneys for Defendants City of San Diego, et al.

By: K SANDOVAL, Deputy

9 SUPERIOR COURT OF THE STATE OF CALIFORNIA  
10 COUNTY OF SAN DIEGO

11 STEVEN CURRIE; and ASSOCIATION OF  
12 CONCERNED TAXPAYERS, a California non-  
13 profit corporation,

14 Plaintiffs,

15 v.

16 CITY OF SAN DIEGO, METROPOLITAN  
17 WASTEWATER DEPARTMENT OF THE  
18 CITY OF SAN DIEGO, WATER  
19 DEPARTMENT OF THE CITY OF SAN  
20 DIEGO and DOES 1-500,

21 Defendants.

Case No. GIC 857292

[PROPOSED] ORDER OF DISMISSAL

Date: June 23, 2006  
Time: 1:00 p.m.  
Judge: Hon. Ronald S. Prager  
Department: 71  
Complaint Filed: November 22, 2005

22 This Court, having granted Mazzarella Caldarelli's Motion to be Relieved as Counsel, set  
23 a Case Management Conference and Order to Show Cause Why Case Should Not Be Dismissed  
24 hearing for June 23, 2006 at 1:00 p.m. in Department 71. Plaintiffs, having received notice of  
25 said hearing, failed to appear at the hearing or otherwise protest dismissal of this action. Good  
26 cause appearing therefore;

27 IT IS HEREBY ORDERED, that the above entitled action is dismissed.

28 RONALD S. PRAGER

Date: JUL 06 2006

Hon. Ronald S. Prager

# Exhibit 37

RESOLUTION NUMBER R-303095

DATE OF FINAL PASSAGE \_\_\_\_\_

A RESOLUTION OF THE CITY COUNCIL ACCEPTING THE  
2006 WATER REUSE STUDY AND TAKING RELATED  
ACTION.

WHEREAS, on January 13, 2004, the City Council adopted Resolution No. R-298781 directing the City Manager to conduct a study evaluating all aspects of a viable increased water reuse program, including but not limited to groundwater storage, expansion of the distribution system, reservoirs for reclaimed water, livestream discharge, wetlands development, and reservoir augmentation (also known as indirect potable reuse); and

WHEREAS, the City Council has reviewed and considered the 2006 Water Reuse Study completed pursuant to Resolution No. R-298781; NOW, THEREFORE,

BE IT RESOLVED, by the Council of the City of San Diego, that the 2006 Water Reuse Study is hereby accepted.

BE IT FURTHER RESOLVED, that the Mayor or his designee is hereby directed to develop a plan for implementation of the NC-3 strategy, as set forth in the 2006 Water Reuse Study, for future consideration by the City Council which includes, but is not limited to, the following elements:

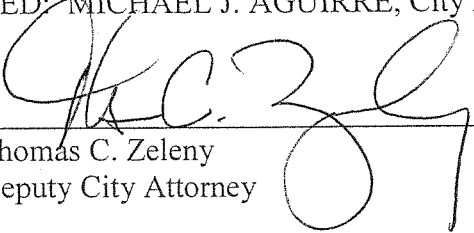
1. an independent energy and economic analysis of all water supply augmentation methods in the Long Range Water Resources Plan; and
2. a current flow and detention study at the San Vicente Reservoir, and
3. a one year indirect potable reuse demonstration project to begin on July 1, 2008.

BE IT FURTHER RESOLVED, that the Mayor or his designee is directed to lead an effort for community education and outreach regarding the NC-3 strategy and indirect potable reuse to begin in January of 2008, ensuring that communities that have not had any prior presentations on this topic be the first to receive the education process.

BE IT FURTHER RESOLVED, that the Mayor or his designee is directed to present an update at a City Council meeting in January of 2008 on the status of the progress on the plan for implementation of the NC-3 strategy and the community education and outreach efforts set forth in this resolution.

APPROVED: MICHAEL J. AGUIRRE, City Attorney

By

  
Thomas C. Zeleny  
Deputy City Attorney

TCZ:

10/31/07

Or.Dept:CityAtty

R-2008-382

I hereby certify that the foregoing resolution was passed by the Council of the City of San Diego, at its meeting of \_\_\_\_\_.

ELIZABETH S. MALAND, City Clerk

By \_\_\_\_\_  
Deputy City Clerk

Approved: \_\_\_\_\_  
(date)

\_\_\_\_\_  
JERRY SANDERS, Mayor

Vetoed: \_\_\_\_\_  
(date)

\_\_\_\_\_  
JERRY SANDERS, Mayor

# Exhibit 38



FOR IMMEDIATE RELEASE

November 14, 2007

**MAYOR JERRY SANDERS  
FACT SHEET**

## **Mayor Vetoes Council's "Toilet to Tap" Plan**

Mayor Jerry Sanders has vetoed the City Council's action to direct the City of San Diego Water Department to design a pilot project for Indirect Potable Reuse (IPR) or "toilet to tap" as it is commonly termed. The Mayor chose to veto the Council's action for many reasons including:

- The public's repeated rejections of attempts to implement IPR over the past 15 years
- Lack of funding for design and implementation of any IPR pilot project
- The need to saddle ratepayers with the third water rate increase in less than 12 months should Council demand the pilot project
- The high costs and small amount of water created by IPR
- The need to focus on water supply options that can be more quickly developed and implemented

### **"TOILET TO TAP" COSTS MORE THAN OTHER WATER SOURCES**

Indirect potable reuse is not a silver bullet to fix all of the region's water needs. Even a costly pilot project would take years to develop and would produce water far more expensive than other supplies.

Cost Comparison of Water (cost per Acre Foot)	
	Cost to City
Indirect Potable Reuse <sup>1</sup>	\$1,882*
Desalinated Water <sup>2</sup>	\$1,400*
Raw Water <sup>3</sup>	\$515
Potable Water <sup>3</sup>	\$679

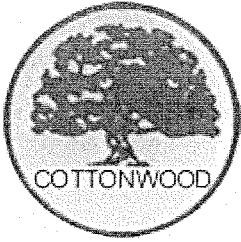
1 Source: Water Reuse Study, March 2006 – Indirect Potable Reuse costs are the combination of Advanced Treated Water and Tertiary Treatment (planning level numbers)

2 Cost estimates were extrapolated from SDCWA 2003 estimates

3 Source: San Diego County Water Authority budget document, Effective January 1, 2008

\* Does not include eligible incentives or credits

# Exhibit 39



# COTTONWOOD

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## WATER & SANITATION DISTRICT

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### Mission Statement

**Provide high quality, reliable, sustainable water and ecologically safe wastewater collection and treatment with a commitment to service excellence and cost effectiveness.**

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## INDIRECT POTABLE REUSE (WATER RECYCLING)

In traditional water systems, raw water is diverted from a source, such as a stream, lake, or aquifer, and treated before being distributed to consumers for drinking water. After use by consumers, wastewater is collected, treated and discharged to a receiving water body, often to the same one from which raw water is diverted. The discharge of treated wastewater occurs downstream of the raw water diversion.

In many places in the United States unplanned indirect potable reuse is being practiced. Unplanned potable reuse occurs when treated wastewater discharged from an upstream community is subsequently withdrawn for drinking water use downstream by another community. The fraction of wastewater effluent in the raw drinking water can vary significantly depending upon the relative amounts of native water and effluent. In some cases, more than half of the water in rivers used as a drinking water source comes from wastewater discharges.

In planned indirect potable reuse systems, treated wastewater is intentionally used to augment water supplies. Rather than discharging treated wastewater downstream of the raw water diversion, it is returned upstream. The treated wastewater mixes with native water

and then is diverted and treated for potable use.

Fundamental to the practice of planned indirect potable reuse is the concept of multiple barriers to remove contaminants. These barriers include wastewater treatment, dilution and natural cleansing in the water body, effective drinking water treatment, and extensive raw and treated water monitoring to ensure high quality drinking water.

Planned indirect potable reuse systems should incorporate a number of safety measures beyond those normally included in conventional water systems. These barriers to potential contaminants include advanced wastewater treatment, the receiving water, and the water treatment system. Facility redundancy and increased water quality testing enhance system reliability.

There are a number of successful planned indirect potable reuse systems in operation across the country. There are systems in California, Virginia and Texas that provide safe drinking water to citizens every day. Several of these systems have been operating for over 25 years. Studies have shown that there are no health effects, long or short term, as a result of consuming reclaimed water.

The proposed Cottonwood Water and Sanitation District (CWSD) and Arapahoe County Water and Wastewater Authority (ACWWA) planned indirect potable reuse project will have multiple barriers to produce safe water for their consumers. Wastewater is treated at the Lone Tree Creek Wastewater Treatment Plant (LTCWWTP). This advanced treatment plant provides biological nutrient removal followed by membrane microfiltration and disinfection. The plant successfully removes nitrate and phosphorous, as well as pathogens. The highly treated effluent would be discharged into the Cherry Creek alluvium, an aquifer influenced by surface water flow in Cherry Creek. The water will seep through the sandy alluvial material taking about 18 months to reach the supply wells. While travelling through the alluvium, the water will be further filtered and diluted with native flows. After reaching the supply wells, the water will be treated in a new advanced water treatment facility. The treatment will include a reverse osmosis membrane process to remove organic and pathogenic contaminants. The clean water from the membrane process will then be disinfected and distributed to CWSD and ACWWA customers.

Recent articles on the subject of planned indirect potable reuse were researched. The following literature review of these articles includes title, author(s), date, and a summary of the main points.

#### TOP

*Recharge Project Overcoming Impediments  
to Water Recycling: The San Gabriel Valley  
Groundwater, Hartling, Earle C., and*

- Initially developed in 1989, the San Gabriel Valley Groundwater Recharge Project is a 25,000 AFY project. Tertiary treated effluent from the Sanitation Districts of Los Angeles County San Jose Creek West WRP is used to surface recharge a potable water aquifer in the San Gabriel Valley. A 10,000 AFY "demonstration" was scheduled for completion in late 2001.
- California DHS required 450 mg-min/L CT (chlorine residual multiplied by contact time) and a minimum of 90 minutes contact time (peak dry weather flow) for 5-log virus inactivation.

## TOP

*Use of Recycled Water to Augment Potable Supplies: An Economic Perspective*, Potable Reuse Committee, WaterReuse Association, Sept. 1999.

- The East Valley Water Recycling Project, proposed by the City of Los Angeles Department of Water and Power, has an ultimate capacity of 35,000 AFY. The water would be used for industry, irrigation, and groundwater recharge of potable aquifers. The estimated cost of the project is \$478 per acre-foot.
- The Groundwater Replenishment System operated by the Orange County Water District and Orange County Sanitation District employs reverse osmosis and UV disinfection of secondary treated wastewater. The effluent is disposed of at existing spreading basins or injection wells for replenishment of groundwater supply and seawater intrusion control barrier, respectively. The existing capacity will be 68,000 AFY by 2003, and the ultimate capacity is 20,000 AFY. The cost of the project is estimated to be \$565 per acre-foot.
- The City of San Diego Water Purification Project would construct a system with a capacity of 15-20,000 AFY. The system would include microfiltration, reverse osmosis, ion exchange and ozonation to treat North City WRP tertiary effluent. The project would also include the construction of a pipeline to the San Vicente water supply reservoir. The estimated cost of the project is \$1,060 per acre-foot.

## TOP

*Development of Regulations for Potable Water Reuse in Georgia*, Hall, Ken C., WEFTEC 2000.

- The key points of the paper are: the provision of multiple barriers to key pollutants, provision of reliability and

redundancy, use of demonstrated technologies, protection of public health, and importance of public perception.

- ♣ In order to reuse treated wastewater to augment the water supply, the draft guidelines would require two barriers for suspended solids, three barriers for pathogens, and one barrier each for both metals and total organic carbon.
- ♣ Biological nutrient removal, nanofiltration, and reverse osmosis are considered barriers for suspended solids, pathogens, metals, and total organic carbon. Microfiltration and ultrafiltration are considered barriers for suspended solids, pathogens, and total organic carbon. Disinfection is considered a barrier for pathogens.
- ♣ Based on this, the proposed project would include three barriers for suspended solids, five barriers for pathogens, two barriers for metals, and two barriers for total organic carbon. This does not include the aquifer, which is not considered in the guidelines.
- ♣ The guidelines also include monitoring and effluent limits for the wastewater treatment plant. Turbidity, TOC, and total coliform limits would be imposed on the wastewater discharge. For discharges to water supplies, Turbidity would be sampled every 4 hours and the maximum limit for any sample would be 5.0 NTU. TOC would be monitored daily and the maximum monthly average would be 10 mg/l. Total coliforms would be sampled daily, and at least 75% of the results shall be less than detect and no sample shall exceed 25 cfu/100 ml.
- ♣ Semiannual samples for giardia and cryptosporidium shall be taken and analyzed for discharge to water supply reuse. Results shall always be less than detect.
- ♣ There would also be finished water quality requirements. Reclaimed water shall not cause violation of water quality standards of the receiving water body in addition to standards set forth in guideline. Priority pollutant and SDWA parameters shall be analyzed semiannually.
- ♣ Indirect potable reuse is the preferred option for potable reuse. It has also been proven safe after years of unintentional practice.

#### TOP

*Developing Indirect Potable Reuse to Increase Water Supply, Improve Water Quality and Manage Wastewater Discharge in Orange County, California*, Anderson, Blake P., Thomas M. Dawes, Gregory L. Leslie, Donald F. McIntyre, William R. Mills Jr., J.E. Norman, Wendy Sevenandt, and T.S. Snow, WEFTEC 2000.

- ♣ Three phase, 100,000 AFY Groundwater Replenishment system

to recharge local groundwater basin by Orange County Water District and Orange County Sanitation District.

- ✿ System design based on new regulatory guidelines, which include complete treatment with a process designed to reduce the concentration of TOC. Additional treatment with a process to remove TDS might be required to comply with local groundwater quality objectives.
- ✿ The use of ultrafiltration and microfiltration as pretreatment for reverse osmosis is the industry standard for indirect potable reuse.
- ✿ California DHS requires 2,000 foot horizontal separation and a one-year detention time between the point of injection and extraction for indirect potable reuse projects.

## TOP

### *East Valley Water Recycling Project: Challenges of Implementation, Van Wagoner, William T., WEFTEC 2000.*

- ✿ City of Los Angeles Department of Water and Power project will ultimately provide 35,000 AFY of tertiary treated recycled water for groundwater recharge, irrigation, and industrial uses.
- ✿ Three-year demonstration project started in September 1995, providing 10,000 AFY for groundwater recharge.
- ✿ Proposed requirements state that water extracted from the ground may not contain more than 20% recycled water over the course of a five-year running average.
- ✿ Groundwater recharge regulations specify that monitoring wells be placed one fourth and half of the distance between the spreading grounds and the closest domestic production well.
- ✿ Extensive public involvement program. Six public hearings, nine press releases, a media open house, 46 newspaper articles, numerous television news reports, project information bill stuffers, a project hotline telephone, numerous project fact sheets, a project description was published on the Department's website, and two full page color articles in the *Los Angeles Times* were all part of the program. The program began in 1990 and ran through April 2000.
- ✿ Project currently under review by City Council.

## TOP

### *Microfiltration and Reverse Osmosis Pilot Testing for Indirect Potable Reuse at the University Area Joint Authority, Book, Brian L., Steven M. Siegfried, Stephen T. Welch, and Jason D. Wert, WEFTEC 2001.*

- ✿ Pilot testing facility constructed to determine the feasibility of

reclaiming 3.0 mgd of secondary effluent for water reuse and streamflow augmentation.

- ♣ Commercial and industrial customers will use effluent, followed by discharge to Slab Cabin Run. The discharge will mix with several State College Borough Water Authority supply wells, and the Pennsylvania Department of Environmental Protection determined the expected treatment level for indirect potable reuse.
- ♣ "Microfiltration/Ultrafiltration is not sufficient alone to completely produce recycled water that meets all established water quality limits." Nitrates, TDS, and TOC are of concern to this project (all of these would be removed by reverse osmosis, BNR would remove nitrate).

## TOP

*Indirect Potable Reuse and Aquifer Injection of Reclaimed Water*, Beverly, Sharon D., William J. Conlon, and David F. MacIntyre, AWWA Water Sources Conference Proceedings 2002.

- ♣ Membranes followed by ultraviolet disinfection provides multiple effective barriers.
- ♣ Pilot study in Orlando, Florida looked at reinjecting water into aquifer or augmenting lakes for potable reuse.
- ♣ Reverse Osmosis is not always necessary to reach desired water quality.
- ♣ All indirect potable reuse projects would have to meet Florida Maximum Contaminant Levels for Direct Aquifer Injection. These MCLs include primary and secondary drinking water standards, TOC less than 3.0 mg/l, total organic halides less than 0.2 mg/l, and total nitrogen less than 10.0 mg/l.
- ♣ Membrane fractionation studies showed that NF removed all contaminants except nitrate. 50 Daltons was the effective molecular weight cutoff for nitrate. This cutoff is designated as an RO membrane.

Thomas, and Tama Snow, WaterReuse Association Newsletter, 1998.

- ♣ National Research Council (NRC) report entitled Issues in Potable Reuse: the Viability of Augmenting Drinking Water Supplies with Reclaimed Water in March 1998.
- ♣ Careful, thorough, project-specific assessment that includes contaminant monitoring, health and safety testing, and system reliability evaluation is required for indirect potable reuse projects.

## TOP

*The Ongoing Evolution of Water Reuse  
Criteria*, Crook, James, AWWA Water  
Sources Conference Proceedings, 2002.

- ♣ The California Water Recycling Criteria were updated in 2000. The updated criteria include total coliform limits and required treatment for groundwater recharge by spreading are determined on a case-by-case evaluation.
- ♣ Disinfection requirements of 2000 California Water Recycling Criteria include a chlorine disinfection process that provides a residual chlorine concentration times modal contact time (CT) value of at least 450 mg-min/L at all times with a modal contact time of at least 90 minutes where disinfected tertiary treated wastewater is required. This is based on the Pomona Virus Study.
- ♣ The paper summarizes the USEPA Guidelines for Water Reuse. Groundwater recharge of potable aquifers by injection and augmentation of surface water supplies requires secondary, filtration, disinfection, and advanced water treatment. Water quality goals include pH 6.5-8.5, turbidity less than 2 NTU, no detectable fecal coliforms, less than 1 mg/L chlorine residual, and compliance with all drinking water standards.
- ♣ USEPA Guidelines for Water Reuse has different requirements for groundwater recharge of potable aquifers by spreading. It requires site-specific treatment with secondary treatment and disinfection at a minimum. The reclaimed water quality is also site specific, but must be able to meet drinking water standards after percolation through the vadose zone.
- ♣ The paper also presents the World Health Organization guidelines for potable municipal reuse. They include no fecal coliform or virus particles plus no toxic effects on man. Essential treatment processes include primary, secondary, nitrification, and disinfection. In addition, one or more of the following processes will be essential: filtration or equivalent, denitrification, chemical clarification, carbon adsorption, and ion exchange or other means to remove ions.

TOP

*Too Much or Too Little: Public Health  
Perspectives of Water Reclamation  
Reliability*, Riley, Craig L., AWWA Water  
Sources Conference Proceedings, 2002.

*People are Watching: Public Participation  
in a "Win-Win" Reuse Project*, Janga, Ram  
G., and Richardson, Andrew W., AWWA  
Water Sources Conference Proceedings.

- 💧 10-mgd plant called Northwest Water Resource Center began operation in Las Vegas in July 2001. The plant treats municipal wastewater for irrigation use in the summer, and for potable water storage in the aquifer during the winter. Recharge/recovery wells inject/withdraw water from the aquifer based on demand and time of year.
- 💧 Community Relations and Public Involvement Program was developed for the project. They took on a number of tasks including development of audio-visual programs, brochures, fact sheets, project newsletters, and news releases. They also coordinated with the media, organized public information meetings, responded to public inquiries via phone and mail, and organized field trips to similar projects.

### TOP

*Indirect Potable Reuse: Committee Report,*  
McEwen, Brock, and Tom Richardson,  
AWWA/WEF Water Reuse Conference  
Proceedings, 1996.

- 💧 Water supply development policy has shifted from large, trans-basin water conveyance projects to conservation and reuse.
- 💧 More stringent wastewater disposal standards are becoming common. It may be more advantageous to reclaim treated wastewater for potable use than discharge highly treated water to sensitive aquatic systems.
- 💧 Current planned indirect potable reuse in Los Angeles County, CA, Orange County, CA, Fairfax County, VA, and El Paso, TX.

### TOP

**"Potable use of Reclaimed Water,"** Crook,  
James, Jacqueline A. MacDonald, and R.  
Rhodes Trussell, *Journal AWWA*, August  
1999.

- 💧 Treatment technology is advanced enough that very high quality water can be produced from wastewater effluent.
- 💧 More than two dozen large water utilities use water that receives significant contributions from wastewater discharges.
- 💧 Reuse requirements should exceed drinking water and wastewater discharge requirements.
- 💧 Public health should be protected by providing increasingly effective and reliable treatment and through more comprehensive monitoring in scope and frequency. Projects with less conservative treatment should incorporate more comprehensive monitoring and vice versa.
- 💧 More rigorous pretreatment programs should be considered

when indirect potable reuse is planned.

- ♣ Multiple barriers are essential.
- ♣ Aquifer storage appears to be a better buffer for reclaimed water than surface water bodies.
- ♣ The treatment of the water in the aquifer may be considered an additional barrier to certain contaminants.
- ♣ Alternative means of disposing of reclaimed water should be maintained in the event that water quality standards are not met.

## TOP

### **Using Reclaimed Water to Augment Potable Water Resources**, Joint Task Force of the Water Environment Federation and the American Water Works Association, 1998.

- ♣ From the WEF water reuse policy statement: "Treated wastewaters already comprise an unplanned, but significant component of our nation's freshwater supplies through discharge to streams, lakes, and groundwater basins used to supply domestic, industrial, and agricultural water demands."
- ♣ From the AWWA water reuse policy statement: "...whereby reclaimed water is a supplement to existing raw water sources receiving appropriate subsequent treatment."
- ♣ System reliability takes on far greater importance in a potable water reuse project.

## TOP

### **Issues in Potable Reuse**, National Research Council Commission on Geosciences, Environment, and Resources Water Science and Technology Board, 1998.

- ♣ Concerns about planned indirect potable reuse also apply to conventional water supplies under the influence of wastewater discharges.
- ♣ Significant health risks have not been identified in communities using reclaimed water. This is confirmed by analytical and toxicological testing as well as epidemiological studies.
- ♣ Indirect potable reuse system requirements should exceed the requirements for conventional water treatment facilities.
- ♣ Every reuse project should have a rigorous and regularly updated monitoring system to ensure the safety of the product water.
- ♣ All major chemical inputs from household, industrial, and agricultural sources should be considered.
- ♣ Stringent industrial pretreatment and pollutant source control programs should be used.
- ♣ Potable reuse systems should continue to employ strong chemical disinfection processes to inactivate microbial

- contaminants even if they also use physical treatment systems.
- ♣ Barriers for microbiological contaminants should be more robust than convention water treatment.
- ♣ Operators of reuse facilities need training beyond that typically provided.

## TOP

### *Singapore Water Reclamation Study – Expert Panel Review and Findings, June 2002.*

- ♣ "NEWater" project in Singapore began in 1998. Project takes effluent from the Bedok Water Reclamation Plant and treats it with microfiltration, reverse osmosis, and UV. The plan is to augment raw water reservoirs with reclaimed water.
- ♣ 2.6 mgd demonstration plant in operation since May 2000. The plant demonstrated that reclaimed water can be consistently and reliably produced on a large scale.
- ♣ Sampling and Monitoring Programme included extensive analysis of many parameters in the following categories: physical, disinfection by-products, inorganic, disinfection by-products, pesticides/herbicides, radionuclides, wastewater signature components, synthetic and natural hormones, and microbes.
- ♣ The report concludes that the physical, chemical, and microbiological data for the reclaimed water are within the requirements of USEPA and the World Health Organization.
- ♣ A health effects study on mice and fish is being conducted.
- ♣ To date, the Health Effects Testing Programme show that exposure to or consumption of reclaimed water does not have carcinogenic or estrogenic effects on fish or mice.
- ♣ Expert Panel findings include: reclaimed water is considered safe for potable use; Singapore should adopt indirect potable reuse because trace minerals are provided, by blending with natural reservoir, that are removed from reclaimed water by treatment, storage provides additional safety, and for public acceptance; Singapore should consider the use reclaimed water for indirect potable reuse as it is a safe supplement to the water supply; and a vigilant and continuous monitoring programme be implemented if indirect potable reuse is used.

## TOP

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To report a problem with the site or to make suggestions, please email the site administrator at [info@cottonwoodwater.org](mailto:info@cottonwoodwater.org) We welcome all of your comments or suggestions.

# Exhibit 40



THE CITY OF SAN DIEGO



# *Urban Water Management 2005 Plan*

the Long-Range Plan. The Long-Range Plan was unanimously adopted by the City Council on December 9, 2002.

The Long-Range Plan is flexible and adaptive to a changing environment, and will provide the City with a “roadmap” for developing water supply alternatives. In addition the City has successfully completed numerous projects and water infrastructure improvements providing the residents of San Diego with a reliable and safe water supply.

Currently, one of the challenges the City of San Diego is tackling is future funding. Due to the lack of current published financial statements and the completion of related audits and investigations, the Water Department is unable to secure bonds for new projects. At this time the Water Department has ceased awarding new contracts for the CIP program so the city does not obligate itself to contracts it may not be able to fully fund without additional financing.

Although the City of San Diego is not planning any new water supply projects or programs to be included in the 2005 Plan, we fully support the Water Authority in their Capital Improvement Program and their exploration of new water supply opportunities.

## **2.7 DEVELOPMENT OF DESALINATED WATER**

### ***Future Supplies***

In 2002, the City of San Diego City Council adopted the Long-Range Plan which provided a decision-making framework for evaluating water supply options. The Long-Range Plan identified and included, among other items, groundwater and ocean desalination as potential near-term and long-term supplies. The Long-Range Plan concluded that no single supply source would be sufficient to meet future water demands, but a portfolio of supply options would reduce the City’s dependence upon imported water over time.

The Long-Range Plan identified priority supplies for implementation. The supply options included water conservation and recycled water, groundwater storage, brackish groundwater desalination, and water transfers. Conservation programs and recycled water supply projects have been implemented and will be continuing through 2010 and beyond. The Water Department is currently investigating the development of groundwater desalination and water transfers for 2010 to 2020. Efforts are ongoing to identify longer range opportunities (2010 and 2030) such as ocean desalination.

### ***Ocean Desalination***

Ocean Desalination is a process where salt and other impurities are removed from seawater. Desalinated seawater is used as a potable water supply in many areas of the world where fresh water is deficient and sometimes described as a solution to the San Diego region’s over reliance on the Colorado River and Northern California.

Although the City of San Diego is not including an ocean desalinated water supply in the 2005 Plan to meet demands in the 2005-2010 timeframe, the City supports the Water Authority in its hard efforts to promote ocean desalination as a viable technology in San Diego County.

In the past, City of San Diego surface water quality has been considered good to excellent. Water quality can vary with imported water inflows and surface water contamination. Source water protection is considered a key element in local water quality. The City of San Diego is working to improve watershed awareness and management. Currently, the most significant water quality issue that affects the public is algae blooms, which can create taste and odor problems.

In San Diego County, DHS has primacy over the implementation of the SDWA. The SDWA regulates source water protection to ensure public health through the multiple barrier approach, an approach that anticipates that the public will participate in source water protection. Member agencies in the Water Authority's service area that have surface water have a good, long-standing, working relationship with DHS.

## **6.4 GROUNDWATER**

Two water quality parameters that can affect reliability of groundwater resources are contamination from Methyl Tertiary Butyl Ether (MTBE) and high salinity levels.

### ***Salinity***

Increased TDS in groundwater basins occurs either when basins near the ocean are over drafted, leading to seawater intrusion, or when agricultural and urban return flows add salts to the basins. Much of the water used for agricultural or urban irrigation infiltrates into the aquifer, so where high TDS irrigation water is used or where the water transports salts from overlying soil, the infiltrating water will increase the salinity of the aquifer. Using this resource requires costly demineralization projects.

To protect the quality of these basins, the Regional Board often places restrictions on the salinity levels of water used for basin recharge or for irrigation of lands overlying the aquifers. Where these restrictions are in place, water reuse and aquifer recharge may be restricted, or expensive mitigation measures may be required.

### ***Methyl Tertiary Butyl Ether***

Until recently, MTBE was the primary oxygenate in virtually all the gasoline used in California. In January 2004, the Governor's executive order to remove MTBE from gasoline became effective, and now ethanol is the primary oxygenate. MTBE is very soluble in water and has low affinity for soil particles, thus allowing the chemical to move quickly in the groundwater. MTBE is also resistant to chemical and microbial degradation in water, making treatment more difficult than the treatment of other gasoline components.

MTBE presents a significant problem to groundwater basins. Leaking underground storage tanks and poor fuel-handling practices at local gas stations may provide a large source of MTBE. Improved underground storage tank requirements and monitoring, and the phase-out of MTBE as a fuel additive, will probably decrease the likelihood of MTBE groundwater problems in the future.

